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# An Analysis of the Effect of War on the United States Stock Market

**Abstract**

While different scholars agree that war has a significant impact on the volatility in the United States stock market, they come to contradictory findings on the direction of this impact. The goal of this thesis is to analyze the effects that war has on the returns in U.S. financial markets. The empirical study employs quarterly prices of the Dow Jones Industrial Average index from October 1960 to September 2015 and applies a time series model in order to determine the effects on stock prices during U.S. war involvements overseas. Results show that even though the entry of United States into war has a positive effect on the quarterly returns from the Dow Jones Industrial Average index, different types of war can have an increasing or decreasing impact on DJIA real returns. This has important implications for investors today and in the future.

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LAKE FOREST COLLEGE

Senior Thesis

An Analysis of the Effect of War on the United States Stock Market

by

Kristina Simeunovic

April 15, 2016

The report of the investigation undertaken as a  
Senior Thesis, to carry two courses of credit in  
the Departments of Economic, Business and Finance and  
the International Relations Program

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Michael T. Orr  
Krebs Provost and Dean of the Faculty

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Carolyn Tuttle, Chairperson

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James Marquardt

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Robert Lemke

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Aleksandar Jankovski



## **ABSTRACT**

### **An Analysis of the Effects of War on the United States Stock Market**

While different scholars agree that war has a significant impact on the volatility in the United States stock market, they come to contradictory findings on the direction of this impact. The goal of this thesis is to analyze the effects that war has on the returns in U.S. financial markets. The empirical study employs quarterly prices of the Dow Jones Industrial Average index from October 1960 to September 2015 and applies a time series model in order to determine the effects on stock prices during U.S. war involvements overseas. Results show that even though the entry of United States into war has a positive effect on the quarterly returns from the Dow Jones Industrial Average index, different types of war can have an increasing or decreasing impact on DJIA real returns. This has important implications for investors today and in the future.

## **DEDICATION**

*I with love to dedicate this thesis to my husband Dalibor Plecas, who has provided me with constant love and support. Without him, this project would not have been made possible.*

## **ACKNOWLEDGMENTS**

I would like to acknowledge Professor Carolyn Tuttle for her extraordinary guidance and support throughout this thesis. There are no words that I can use to express how grateful I am for everything that you have done for me. I would also like to thank Professor Robert Lemke for providing me with his knowledge, mentorship and support in the empirical aspect of this thesis. Conversations with you have brought so many different ideas to the direction of my study. I would also like to acknowledge and thank my Professor James Marquardt for his helpful suggestions, insightful conversations and support. Finally, I give my special acknowledgements to Professor Aleksandar Jankovski who gave support and contributions to this project.



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## **Chapter 1: Introduction**

Economists studied the causes and consequences of war to predict the direction of the future economic activity. Recently, financial market reactions were induced by wars and conflicts. War can confuse investors and produce adverse reactions in the stock market because it raises uncertainty. This uncertainty is a product of investors' inability to predict the war developments and their impact on the stock market. In many instances since 1960, it was unclear to the general public when war was going to start or end, what the cost will be to the United States, and how companies' sales and production trends might be affected. Thus, war can magnify or mitigate the returns that investors are expecting to receive from equity markets. Uncertainty in financial markets can increase inaccuracy of stock price valuations and lower predictability of future price movements.

The thesis begins with a qualitative analysis of war effects that will study the nature of war, characteristics of war (such as war duration, developments, and costs) and underlying macroeconomic responses to determine the relationship of these war factors to economic performance and stock market evaluation. Since there have been no official declarations of war since 1960, the official authorization of war by Congress has an important impact on the war developments, duration, and war financing. Thus, Chapter 2 analyzes whether the way government manages the war matters to financial markets. War financing measures such as the imposition of taxation, debt financing and increasing the money supply will be analyzed for their effect on the economy during and after the war.

The timing and different phases (such as pre-war phase, during the war phase and post-war phase) of war show that different factors affect the returns from the stock

market in different directions (positive and negative). Chapter 3 analyzes different conflicts, in theory, methodology, and conclusions in the research done so far. To establish a detailed analysis of war effect the literature review will look for overall trends in war effect in the pre-war, during the war and post-war phase. The “war puzzle” theory by Brune, Hens, Rieger, and Wang (2012) argues that war will have an adverse effect on stock market performance. According to this theory, in the pre-war period, the likelihood of war and war risk affect stock market prices negatively. Once the war begins, there is a positive shock of war to the return from the stock market. During the war, the likelihood of U.S. winning the conflict rises the stock market evaluation. The polarization of the country that participates in war matters as well, because deep divide in political and social structure depreciates the stock market prices. As the conflict approaches the end, stock prices increase in value again as investors become more optimistic about the future economic movement. After the war has ended, however, the investor observes the consequences of fiscal and monetary policies and adjusts its position in the market.

To clarify the adverse war effects, Chapter 4 tests the relationship of wars to stock market prices from a quantitative perspective. Empirically the effects of the United States involvement in the war on the volatility in stock market performance will be analyzed in hopes of finding the direction of the relationship. Because war characteristics should affect the way wars influence financial markets, the hypothesis assumes that outburst and length of war will affect different and magnitude of regression results. The regression results could be used to predict the direction of the movement in stock prices before the war, during the war, and after the war. Finally, Chapter 5 contains the legal and economic implications of war, conclusions, and proposals for future research.

## **Chapter 2: The United States at War, 1960-2015**

This chapter is a review of the literature on United States' interstate wars. Apart from establishing a war categorization, this chapter also gives a brief overview of origination, developments, ways of war financing and consequences that some of these wars had on the United States. Also, in order to get a deeper sense of what the general public was thinking of war developments at the time, specific wars will be qualitatively analyzed by investigating primary resources such as interviews, speeches or newspaper articles. The goal of this chapter is to define war, describe the war power inside the United States, classify America's modern wars into broad categories, and describe the cases of conflicts that fit the research criteria offering qualitative analysis of these wars. In addition, focusing on the war-economy dynamics, the chapter studies how the performance of the economy is connected to the conduct of America's war.

### **Definition of War**

War is a central problem of international relations studies and politics. Some international relations scholars believe that states decide to use force when diplomacy fails to achieve the desired result. Other experts believe that war is a consequence of the breakdown of the international system because it occurs despite the rules that international institutions created to prevent or reduce the conflict between states. International institutions refers to international organizations, international regimes treaties, and conventions and so on (Duffield, 2007, p. 2). The official definition of war by Stanford University says that war is an actualized, deliberate and extensive armed conflict between political communities (Stanford Encyclopedia of Philosophy, 2005). War is a phenomenon which occurs only between political communities, defined as those

entities which either are nations or intend to become countries. "War is a condition of armed hostility between states" (Hyde, 1945, p. 1686). This definition of states overlaps with Max Weber's (1946) classical definition of the state as an organization exercising legitimate control over its own bounded territory, unchallenged by internal power competition or external intervention (Carlsnaes, Risse-Kappen, & Simmons, 2012, p. 532). "War is a contention, through the use of armed force, between countries, undertaken for the purpose of overpowering another" (Von Glahn, 1992, p. 1992). Classical war is international war, a war between different states, such as the two World Wars. More frequent nowadays are U.S. - terrorist wars. These wars are characterized by the use of military, political, legal and conceptual force against these political pressure groups or terrorist organizations. Thus, it is important to have in mind that a country can intervene in a war with both state and political communities.

### **War Powers inside the United States**

The formal way that the United States goes to war is through a declaration of war. The war power is separated and shared in the United States in the United States Constitution. Constitution, the War Power Clause, specifically Article I, Section 8, Clause 11 states that "the Congress shall have Power to ...Declare War, grant Letters of Marque and Reprisal, and make Rules concerning Captures on Land and Water" (U.S. Const. art. I, § 8). There are no specifications for the format of the legislation that is considered to be "declaration of war" and the Constitution itself does not use this term. In the past, Congress declared war by placing "declaration of war" in the document title. While Congress has the power to declare war, the executive power to make war is vested in the president of U.S., who is the Commander in Chief of the Armed Forces. Additionally, Article II, Section 2 of the Constitution states that "the president shall be

Commander-in-Chief of the Army and Navy of the United States" (Constitution, 1912, p. A7). The war power is a shared power. As the Congress of the United States has the exclusive right to declare war, the president alone cannot send American forces into harms' way.

The Founding Fathers' intent was to minimize, and place checks on a single actor's war power. In August of 1787, the proposed draft of the Constitution stated that the Congress of the United States could "make war." This wording was changed into "declare war" because the Constitution's intent was to allow the executive branch, or the president, to resist sudden attacks (U.S. Const. art. I, § 8). The Constitution is interpreted so that the president can engage in war without assistance and consent of Congress (U.S. Const. art. I, § 8). There are various occasions where presidents engaged in war or military actions without first checking with Congress first. As a response to one of the wars without a congressional declaration, the war in Vietnam, Congress passed the War Powers Act, or War Powers Resolution, in 1973 (United States Congress, 1973). This resolution was an attempt to further change constitutional regulations and requirements in war. War Powers Resolution was approved by both the House of Representatives and the Senate, but President Nixon used his veto power against it. Finally, the joint resolution was passed on November 7, 1973 as Congress overrode presidential veto power by having two-thirds vote in the Senate and House (Civic Impulse, 2016). Thus, by the United States Constitution, the war power in the United States is divided. The Congress is in charge of the process of declaring war while the president has executive war powers.

Since World War II, the United States has not officially declared war. "Although Congress is empowered to declare war, it has done so only on five occasions: the War of 1812, the Mexican War, the Spanish-American War, World War I and World War II"



(Fisher, 1998, p. 194). The Charter of the United Nations failed to recognize war as adequate means used in a nation's foreign policy. Instead, the UN Charter emphasized international peace and cooperation in solving international problems of various nature (such as economic, social, cultural or humanitarian) (Charter of United Nations, 1945, p. 3). The Charter gives the right of self-defense to states, but the states are the ones that decide what situations call for such right. Apart from not having any official declarations of War since World War II, U.S. Presidents have engaged in military operations without direct consent from Congress as well. Since the creation of War Powers Resolution in 1973, 132 reports were submitted to Congress by presidents. Only six military actions were authorized by Congress while others were a unilateral act by the president.

"Authorizations" of war permit the legislative and the executive branch to agree on limited war aims (Elsea, & Weed, 2014). Authorization can lapse without a formal surrender; it can permit military action short of total war. Congress authorized specific statutory authorization within the meaning of War Powers Resolution. As a result, many resolutions and conventional wars were passed. Joint resolutions are used in order to authorize the introduction of United States Armed Forces into hostilities (Elsea, & Weed, 2014). According to the War Power Resolution, joint resolutions are also used to assign members of armed forces to "command, coordinate, participate in the movement of, or accompany the regular or irregular military forces of any foreign country or government when such military forces are engaged, or there exists an imminent threat that such forces will become engaged, in hostilities" (The War Powers Act of 1973). These resolutions have great importance for the United States involvement in war as they mark the beginning of an expanded military role. Therefore, congressional authorizations influence the intensity, funding of the war and duration in terms of use of force.

Wars led by the United States can be divided into two types: congressionally authorized wars and unilateral acts by the president. Table 1 lists wars that Fisher (2004) identified since the 1960s. Apart from the nature of war, the wars vary in duration. For example, Mayaguez Affairs was a unilateral act by the president that lasted only three days, while Vietnam/Gulf of Tonkin war lasted for more than ten years, in the period between August 7, 1964, and April 30, 1975. To understand the economics behind different types of war, it is necessary to comprehend the process of authorization and funds allocation in each scenario. Therefore the following section will analyze the process of congressional war authorizations and unilateral uses of force by the president.

<b>Table 1: U.S. Periods of War and Dates of Recent Conflicts</b>			
<b>War</b>	<b>War Start Date</b>	<b>War End Date</b>	<b>Type</b>
<b>Vietnam War/Gulf of Tonkin</b>	August 7, 1964	April 30, 1975	Congressional war authorization
<b>Mayaguez Affair</b>	May 12, 1975	May 15, 1975	Unilateral act by the president
<b>Operation Eagle Claw</b>	April 24, 1980	April 25, 1980	Unilateral act by the president
<b>Lebanon (Beirut)</b>	September 29, 1982	February 26, 1984	Unilateral act by the president * UN Resolution; Multinational force
<b>Grenada</b>	October 25, 1983	December 15, 1983	Unilateral act by the president
<b>Libya</b>	March 24, 1986	April 18, 1986	Unilateral act by the president
<b>Persian Gulf Escorts/ Operation Earnest Will</b>	May 17, 1987	September 26, 1988	Unilateral act by the president
<b>Panama/Operation Just Cause</b>	December 20, 1989	January 31, 1990	Unilateral act by the president
<b>Persian Gulf War I/Operation Desert Shield/Operation Desert Storm</b>	August 2, 1990	February 28, 1991	Congressional war authorization
<b>Missile Attacks on Baghdad</b>	June 26, 1993	June 26, 1993	Unilateral act by the president
<b>Combat Operations in Somalia/Operation Gothic Serpent</b>	August 8 1993	March 24, 1994	Unilateral act by the president
<b>Haiti/Operation Uphold Democracy</b>	September 19, 1994	March 31, 1995	Unilateral act by the president
<b>Bosnia and Herzegovina/Operation Deliberate Force</b>	August 30, 1995	September 20, 1995	Unilateral act by the president
<b>Iraq missile attacks/Operation Desert Fox</b>	December 16, 1998	December 19, 1998	Unilateral act by the president
<b>Sudan and Afghanistan missile attacks/Operation Infinite Reach</b>	August 20, 1998	August 20, 1998	Unilateral act by the president
<b>Conflicts in Yugoslavia/Serbia</b>	March 24, 1999	June 11, 1999	Unilateral act by the president
<b>Afghanistan/Operation Enduring Freedom</b>	October 7, 2001	Present	Congressional war authorization
<b>Persian Gulf War II/Iraq/Operation Enduring Freedom</b>	March 20, 2003	May 1, 2003	Congressional war authorization
<b>Conflicts in Libya</b>	March 19, 2011	October 31, 2011	Unilateral act by the president
<b>Source: Fisher, L. (2004). <i>Presidential War Powers</i>. Lawrence, KS: University of Kansas Press.</b>			

## **Wars Authorized by Congress**

Wars that are approved by Congress can also be called wars funded, regulated and, governed by Congress. These wars can be either officially declared or undeclared. Thus, Congress can conduct oversight of military forces. Congressional authorizations of war are important as they allow the president to lead a military campaign consistent with the scope defined by Congress. While the President is authorized to carry out these congressionally authorized wars, Congress oversees military forces (Lobel, 2008, p. 393). The Constitution gives Congress the power to regulate military troops and set troop limits (Prakash, 2008, p. 337). Specifically Article 1, Section 8 of the Constitution gives Congress the right to regulate the U.S. armed forces. Once the war is authorized, however, it is the President, qua, Commander-in-Chief who orders the aims, tactics and strategies of the armed forces (Elsea, & Weed, 2014). This indicates that Congress can exercise its power on the military by regulating and financing every use of force or war. Critics hold that there is a gray area of concurrent powers, by which Congress can limit presidential powers (Lobel, 2008, p. 394).

Apart from having greater political support, wars that are authorized by Congress have greater access to capital as the government approves for these outlays in their budget. Legislation such as the Budgeting and Accounting Acts of 1921 and the Congressional Budget and Impoundment Act of 1974 defines the budget process inside the United States (Elsea, & Weed, 2014). The process starts with the President of the United States who submits a request for a budget to Congress. The Congress authorizes the funds for general federal government programs (Elsea, & Weed, 2014). The House and Senate Appropriation Committees allocate funds for the general federal government programs in the following fiscal year. Discretionary spending refers to these spending

sets authorized by Congress. A major part of discretionary spending is military spending. While the President is involved in the allocation of discretionary funds, Congress is the one that has the power to raise and spend money for the federal government. Apart from this, not all appropriation bills and president's budget requests are authorized (Elsea, & Weed, 2014). Congress is also able to enact continuing resolutions that provide for the temporary funding of government operations. Typically, congressional authorizations are made for major military conflicts (Elsea, & Weed, 2014). Apart from having small resource limits, these wars also have no time limits as well and usually last longer than 90 days. Since wars authorized by Congress are long, they have more chances of impacting the economy as they require much more resources than a war shorter than 90 days (Elsea, & Weed, 2014).

### **Unilateral Acts by the President**

The president is required to report to Congress any introduction of U.S. forces into hostilities or imminent hostilities. "The War Powers Resolution (WPR) states that the President's powers as Commander in Chief to introduce U.S. forces into hostilities or imminent hostilities are exercised only pursuant to: (1) a declaration of war; (2) specific statutory authorization; or (3) a national emergency created by an attack on the United States or its forces" (Grimmet, 2012, p. 2). By this resolution, the President has 48 hours to dispatch military forces into action. The military forces cannot stay for more than 60 days in the position without congressional authorization, and the military forces must be completely withdrawn within 90 days if no congressional authorization for the use of military force or a declaration of war by United States is delivered. Military force must be terminated within this time period unless Congress authorizes such use or extends the time period. Before and during these 90 days the president is still recommended to

consult with Congress. Presidents have frequently acted unilaterally, and critics maintain that in doing so presidents took a role of legislative authority when in fact Congress is the only one that has the right to exercise legislative war powers. As the War Powers Act states “President in every possible instance shall consult with Congress before introducing United States Armed Forces into hostilities or situations where imminent involvement in hostilities is clearly indicated by the circumstances” (War Powers Resolution, 1973).

The president can take decisive action to defend the United States, but this does not mean that Congress has no responsibility. Congress has an obligation to vote whether to declare, authorize and continue the war. Some argue that the Supreme Court provided the executive branch with very broad, extensive powers beyond those confined in the Constitution. “The acquiescence theory is one of the strongest arguments today for allowing a president to act alone in the area of foreign affairs” (Chapman, 1996, p. 177). The Court justified this result by Congressional silence. Thus “the President is able to act unilaterally on almost any issue if he is willing to wager that Congress will remain silent, impliedly consenting to his conduct, and thus conferring upon him authority to act” (Chapman, 1996, p. 176).

During this period the decision to commit to war in the United States was seen shifting from the Congress to the executive branch. In most cases legislation authorizing the use of military force has been preceded by a request by the President for such authority (Torreon, 2015, p. 5). “Most recently, due to an expansive interpretation of the President's constitutional authority as Commander-in-Chief of the Armed Forces and of his inherent powers to use force without congressional authorization, the president welcomed support from Congress in the form of legislation authorizing him to utilize

U.S. military forces in a foreign conflict or engagement in support of U.S. interests, but has not taken the view that he is required to obtain such authorization" (Torreon, 2015, p. 5). As a result of the War Powers Resolution, most conflicts since 1980 have been United States' military deployments noted by Congress through reports from Presidents.

The only war power of the president that Congress cannot override is the power to command. The War Powers Act requires the president to start reporting to Congress within 48 hours after he dispatches military force into action (Grimmet, 2001, p. 3).

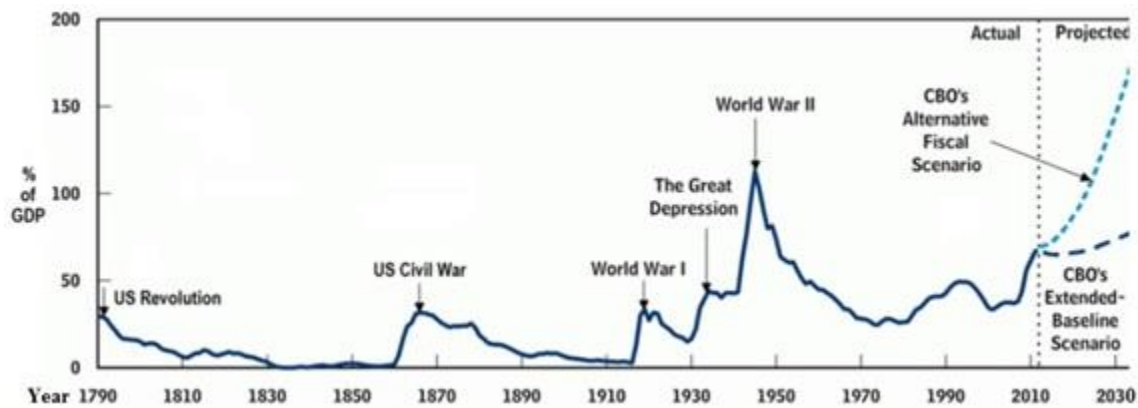
As unilateral acts by presidents are supposed to be shorter wars with fixed costs and resources, it would be logical to assume that these wars had less impact on the economy. While the impact on the economy is intuitive, the impact on financial markets is much more complex as more factors should be looked at during the analysis.

### **War Financing: Three Ways to Finance Government Spending**

War finance and deficit financing are historically related. At the time of war, the United States government has to spend more than its revenue receipts from taxes. War cost is one of the most important factors that influences the economy of the United States, the three types of war financing will be analyzed to determine their effect on the economy. War financing uses different fiscal and monetary policies in meeting the cost of war such as various types of loans, taxation, and the creation of money (Gordon, 1998). Government spending during the war may or may not benefit the economy, but the cost should not be ignored. There are two types of government spending, discretionary and mandatory spending (Stone, 2012, p. 479). While mandatory spending is concerned with essential spending on programs such as Social Security or Medicare, discretionary spending is the type of spending that increases due to war activities (Stone, 2012, p. 479). Because it accounts for one-third of government spending, increases in discretionary

spending raise the total government spending. Figure 1 shows historical increases in debt to finance the wars as a percentage of Gross Domestic Product (GDP). Observing debt as a percentage of GDP is important because the national income of a country is compared to the debt. Significant spikes in the ratio occurred during World War I and World War II. The size of the federal debt has increased in the years since World War II, compared to the years before 1914, with deficit about 30 percent of Gross Domestic Product and edging to about 50 percent in the 2010 (Congressional Budget Office, 2014).

**Figure 1: U.S. Federal Debt as Percentage of GDP (1970-2030)**



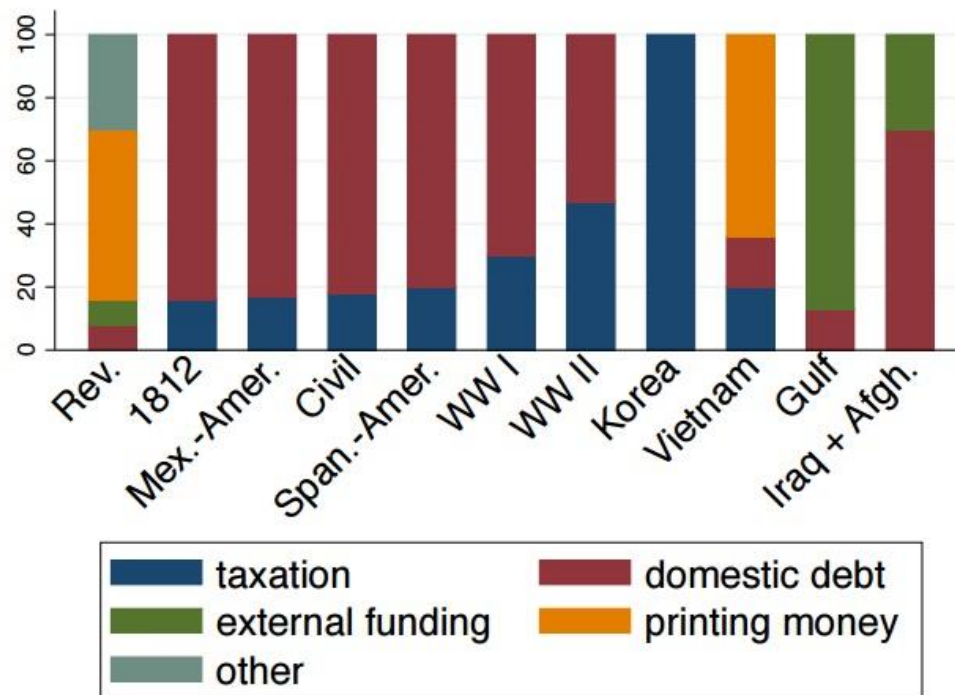
Source: *Congressional Budget Office*, 2014.

The United States raises money for war purposes by increasing government spending and financing it in three major ways: taxation, deficit financing, and printing money. Even though literature says that taxation was the most often used method for war funding, other scholars indicate that the wars were funded by a mix of debt and taxes (Cappella, 2012). The most recent wars, such as wars in Iraq and Afghanistan were financed through debt (Bank, Kirk, & Thorndike, 2008). Thus, states do not only use taxation for modern wars. Figure 2 shows the variation in war financing methods that the United States has used since 1765. While printing money and taxation were the least used methods for war funding, there were still exceptions, such as Korean War, that was financed 100% by these methods. The next section will analyze which factors come into



play when determining the method of war financing.

**Figure 2: Variation in United States' War Finance**



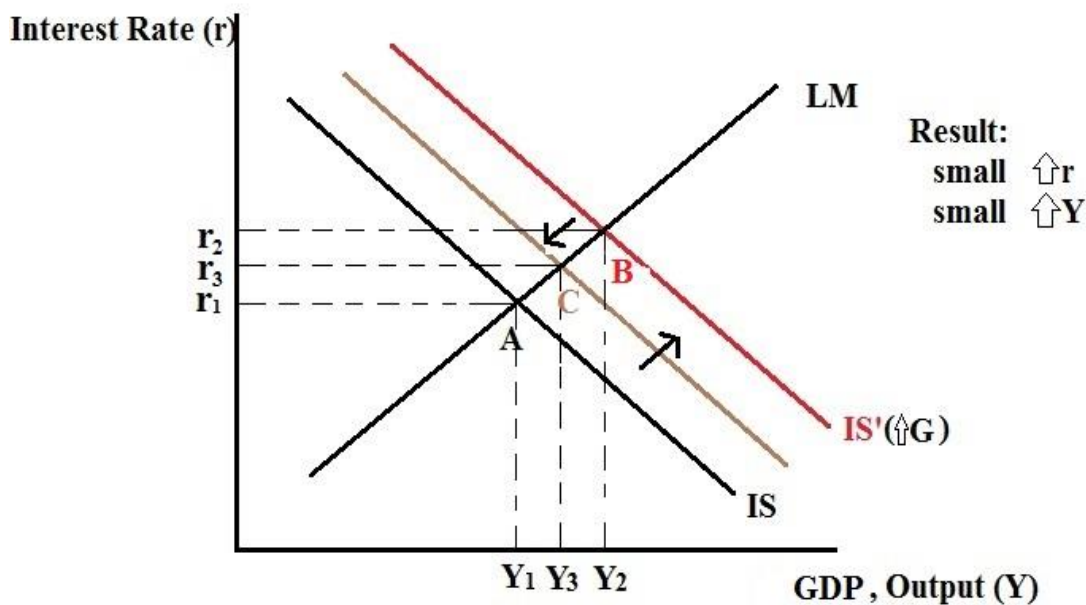
Source: Capella, R. (2012). *The Political Economy of War Finance*. Publicly Accessible Penn Dissertations.

### 1) *Raising Taxes*

To finance an increase in government spending through taxation, the government legally requires their citizens to pay increase in taxes. When government increases taxes and less money is available to the public, the government is using contractionary fiscal policy. Figure 3 shows IS-LM Model, or Hicks-Hansen Model for the occasion where the government raises taxes in order to finance a war. This model demonstrates the relationship that real output, in the goods and services market and assets market have to interest rates (Gordon, 1998, p. 93). The “investment savings” (IS) curve is downward sloping which indicates combinations of income and interest rates at which the goods market is in equilibrium, “given the state of business and consumer confidence, the

marginal propensity to save, and the level of government spending, taxes and net exports” (Gordon, 1998, p. 93). On the contrary, the "liquidity preference money supply" (LM) curve is an upward sloping curve that represents a set of output and interest rate combinations where the money market and bond market are in equilibrium (Gordon, 1998, p. 109). The increase in government spending (G) shifts the IS curve to right. The increase in taxes (T), shifts the IS curve back, to the left because it decreases consumer spending. Since interest rates rise, investment is reduced. This movement from point A backwards to point C is an example of crowding out effect, which describes the effect of an increase in government spending in reducing the amount of investment. Crowding out is defined as “a decrease in private expenditures as a consequence of increased government spending or the financing needs of a budget deficit” (Arnold, 2008, p. 238). Increase in taxes causes only an incomplete crowding out effects, since the decline in investment only partially offsets the increase in government spending. The net result of these shifts is a small increase in both the interest rates and Gross Domestic Product (GDP). To summarize, in the short-run, tax increases hurt the economy as the demand is reduced as a consequence of lower consumption spending. But because government spending increases, the net effect is a small increase in output, or GDP.

**Figure 3: Raising Taxes (IS-LM Model)**



Financing of major wars by the United States has led to changes in taxation. Historical origins of the first federal income tax are the Civil War. In 1862, the Treasury was collecting taxes from federal employees until the law was repealed and declared unconstitutional in 1872 and 1894 respectively (Higgs, 2007). World War I made the federal income tax permanent. World War II brought tax withholding in 1943. In 1969, at the peak of the Vietnam War, the United States reached a budget surplus because of an additional tax surcharge that Congress forced President Lyndon B. Johnson to accept. A ten percent surtax was imposed to pay for the Vietnam War, which raised revenue by about one percent of GDP. “History shows that wars financed by higher taxes, such as the Korean War and the first Gulf War, end quickly, while those financed largely by the deficit, such as the Vietnam War and current Middle East conflicts, tend to drag on indefinitely” (Bartlett, 2009). When raising taxes is not possible, the U.S. government finances its war efforts by raising debt in the form of issuing bonds, or Treasury Bills (T-Bills).

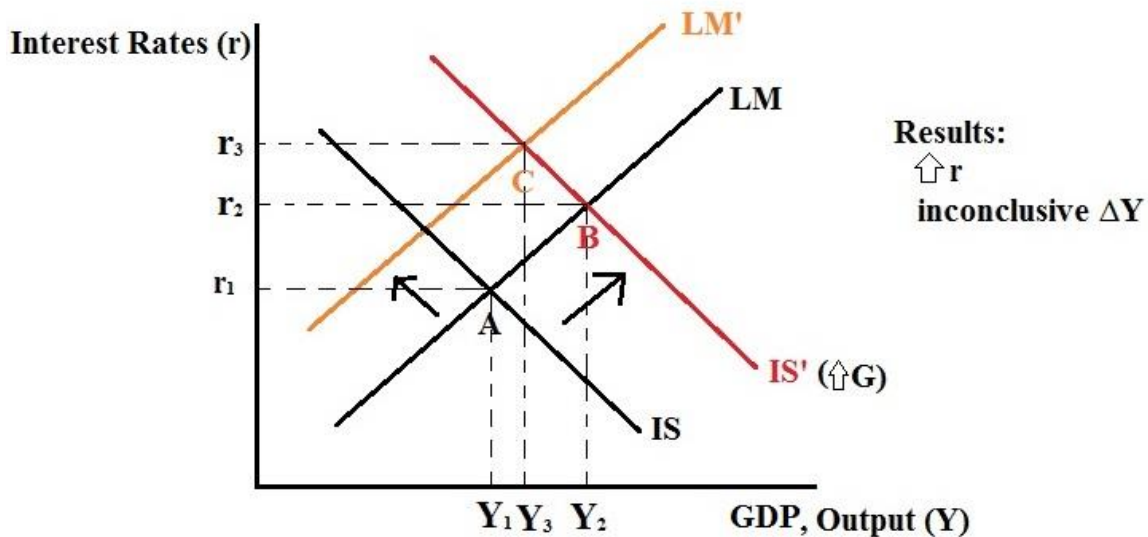
Raising taxes is not popular politically. In 2013, Flores-Macias and Kreps (2013) concluded that taxes “make the cost of war painfully obvious to the general public and undermine support for it, or at least, create incentives for leaders to keep wars short and low cost” (Flores-Macias & Kreps, 2013, p. 31). Thus, war financing through direct taxation decreases the public support and the war duration. The use of taxation also depended historically on partisan preferences inside the United States. According to Flores-Macias and Kreps (2013), “to the extent that taxation meant ad valorem taxes before 1913, Republicans tended to favor war taxes as a form of war finance, as their core constituencies favored protective tariffs and after 1913, when taxes generally meant income taxes, Democrats were more inclined to resort to taxation as a form of war finance” (p. 31). Because the type of tax is changed over time, the Republicans supported lower taxes to preserve business interest, and Democrats supported the progressive measure of income taxation. “Democrats were associated with many wars of the 20th century- World War I, Korea, Vietnam- at a time in which they were the party more sympathetic to taxation” (Flores-Macias & Kreps, 2013, p. 24). Thus, the influence of these two sides is significant for determining whether taxation will be the method for next war financing.

## *2) Treasury Issues T- Bills- the Public Buys Them*

The United States government is known to be the largest issuer of debt securities such as Treasury bills (T-Bills), notes and bonds. Total debt securities outstanding in the third quarter of 2015 was 36,676.5 billion of U.S. dollars (“Summary of debt securities statistics,” 2016). Domestic individuals and foreigners are the ones that hold the T-bills that U.S. Treasury issues. By financing the war through raising debt, the U.S. government is taking money from the public and placing it out of distribution. This public money is

no longer used for consumer spending and investment (Gordon, 1998). Figure 4 shows that, if all other factors remain constant, the interest rates will increase while output will not rise as quickly. Because the United States government has the power to borrow a significant amount of money from the public, the real interest rate will rise substantially. High interest rates are a result of a decrease in bond prices, caused by an influx of government bonds to the market (Gordon, 1998). Because there is a significant amount of T-Bills in the market offered at a discounted price, the public sees them as a better investment option than savings accounts. Thus, private money that was previously used to buy corporate debt is directed to purchasing government debt. This scenario is an example of asset market crowding out because companies' bonds are priced out of the financial market.

**Figure 4: Treasury Issues T-Bills - The Public Buys Them (IS-LM Model)**



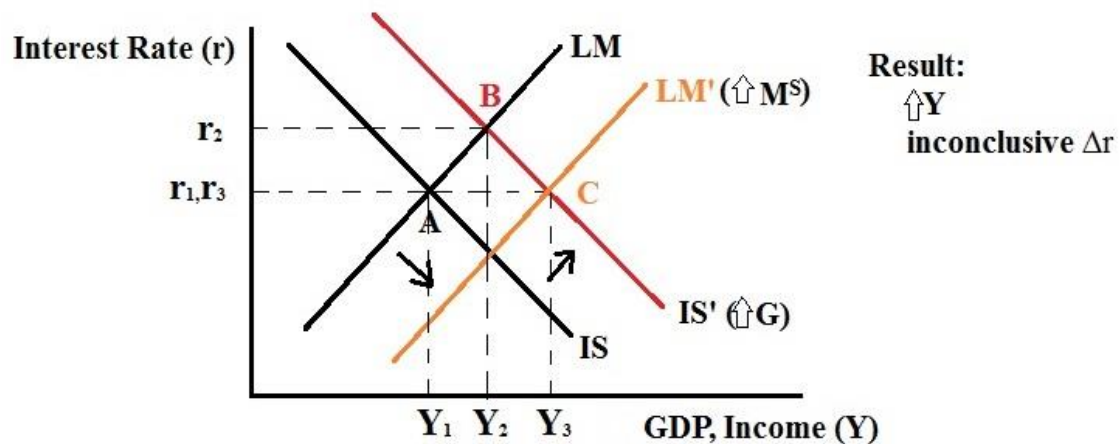
U.S. debt financed most of the modern wars. The long-term cost of this kind of war financing is paying off large amounts of debt incurred as the U.S. government fails to include their costs in annual budgets. Wars in Afghanistan and Iraq were financed largely by domestic and foreign debt. About 70 percent of these wars came from domestic debt

financing and 30 percent from foreign buyers, such as China and Japan (Capella, 2012).

3) *“Monetizing the Deficit”*

The third way of financing a war is when the Federal Reserve buys the government securities, specifically U.S. Treasury Bills. This is an example of expansionary monetary policy where the Federal Reserve’s market operations replace government debt with money (Gordon, 1998). Expanding the money supply is done by the Federal Reserve which then purchases the U.S. T-Bills. Government spending increases which leads to an upward shift in IS curve. This shift in IS leads to increased production and interest rates. However, because the Federal Reserve creates money and increases the money supply (M2), instead of ending at the B point the economy moves from point A to point C. Figure 5 shows that the effect on interest rates is inconclusive and there is no private crowding out since the level of interest rates did not increase. In the short run, however, the effect on Gross Domestic Product is considerable. The increase in total output, or GDP, is a result of an increase in consumer spending, government spending, and investment (Gordon, 1998). By keeping levels of interest rates low, the government encourages individuals, banks and companies to borrow.

**Figure 5: Monetizing the Deficit (IS-LM Model)**



This type of war financing is usually seen in wars where no more taxes can be collected and when the government does not want to increase interest rates. One of the reasons why in 1971 Nixon abandoned the “gold standard,” which was the monetary system that connected the United States dollar to gold, was the government’s intention to increase the money supply (Labonte & Levit, 2008, p. 5). His goal was to get rid of high unemployment and inflation levels without raising the gold reserves. Critics argue that apart from stimulating the economy, Nixon increased the money supply for funding the war in Vietnam (Labonte & Levit, 2008, p. 6). However, they also argue that creating money is one of the riskiest forms of war financing because, in the past, this type of policy would lead to inflation. However, since 2008 until January 2015, the Federal Reserve has tripled the money supply without raising the inflation levels. This phenomenon suggests that traditional theory about monetary policy, money supply, and inflation should be revised.

In conclusion, taxation has a direct impact on individuals’ purchasing power and indicates that there is a clear connection between the public and the war, whereas the costs of borrowing by issuing T-bills are deferred. Thus, there is greater support for war

in the absence of taxation. Taxation, as a form of war finance, is, therefore, identical to borrowing public support for the war. As long as the taxes are low, the public would give higher support for United States involvement in the war. In the absence of a tax increase, however, the cost of war is less apparent to the public. Thus, methods of war financing, other than direct taxation, bring greater public support for the war and lower institutional restraints. Using original experiments conducted in the U.S. and the United Kingdom, Flores-Macias and Kreps (2013) found strong support for the argument that the method of war finance is an important determinant of public support for war (Flores-Macias & Kreps, 2013, p. 4). They argue that borrowing is politically advantageous when compared to taxation. Despite an increase in federal debt, the repayment for it starts long after the war has ended and the leader who was in charge relinquished his duties (Flores-Macias & Kreps, 2013, p. 9). Flores-Macias and Kreps (2013) noted that “conflicts where war taxes are absent experience greater levels of support by as much as 16% compared to the baseline scenario with debt” (p. 23). Whether the approach of financing war is to increase the money supply or sell T-Bills to the public, they both have a political virtue of concealing the costs of war.

Apart from the public support, partisan preferences influence the type of financing that the United States will choose. In the modern period, Democrats were more for taxation than Republicans (Flores-Macias & Kreps, 2013, p. 31). Their findings also show that war duration is affected by the method that government chooses for war financing. Taxes did not finance the longest wars since 1960. Mayhew (2005) argues that “wars seem to be capable of generating whole new political universes” because they can shift the allocation of government resources in the long run.



## **War Cases**

To analyze the impact of different wars authorized by Congress and unilateral acts by the president on the economy and financial markets, the rest of the chapter will look at individual cases of wars that lasted more than 90 days. The case analysis is conducted on four different wars since the 1960s: the Vietnam War, Lebanon War, Persian Gulf War I, and the Wars against Iraq and Afghanistan (War on Terror/Operation Enduring Freedom). Upon providing background and a brief history of the U.S involvement in these particular wars, the impact on the economy and financial markets are observed by using a cost analysis, macroeconomic analysis, and qualitative analysis. The cost analysis is conducted by looking at the data and impact of military spending and ways of war financing. Macroeconomic analysis of each war focuses on observing the impact on national output, inflation, interest rates, unemployment and financial markets. Finally, the qualitative analysis will include an examination of non-measurable data such as opinions, statements, estimations and predictions of economists and political scientists on the outcome of the war and its impact. The purpose of this is to investigate whether theoretical notions found in qualitative analysis match reports and empirical facts.

### *I. Vietnam War*

There are some controversy and debate about the specific date on which the Vietnam War started. The origins of Vietnam War can be traced back to late 1950s when the French began to colonize the region of Indochina. The Vietnam War was primarily fought in South Vietnam between government forces helped by the United States and guerrilla groups supported by North Vietnam. The war began after the Geneva Conference (1954) divided the country into the Republic of Vietnam (South Vietnam) and the Democratic Republic of Vietnam (North Vietnam). Even though it started as a

civil war, it evolved into a limited international conflict which the United States was greatly involved with after August 7, 1964, and did not end until April 30, 1975 (Fischer, 2004, p. 56). Scholars in politics and international relations hold different views on when the Vietnam War started and when the United States got involved in it because of the previous conflicts and Cold War military developments. "The Vietnam War began without fanfare in the United States, and it was from the outset a very different kind of war than the conflicts in recent American memory" (Anderson, 2005, p. 47). Initially, the U.S. provided military help to South Vietnam by sending "military advisors" in 1954-55. In 1961, South Vietnam requested bilateral defense treaty with the United States, by which the U.S. would grant economic and military aid (Anderson, 2005, p. 47). This treaty led to an increase in the numbers of U.S. military forces and the establishment of the U.S. Military Assistance Command in 1961-62. U.S. military involvement in the Vietnam War increased after Congress passed Tonkin Gulf Resolution in 1964, proposed by President Lyndon B. Johnson (Westheider, 2007, p. 23). As costs of the war increased and war became unpopular, Congress blamed the executive branch, the President, for the U.S. failure to achieve its objectives. The Vietnam War and its costs led to the formation of War Powers Resolution, which was an effort to put constraints on president's ability to commit forces overseas.

If observed from the cost analysis perspective, the Vietnam War was one of the most expensive wars in the history of United States. Daggett (2010) presented cost estimates of the major wars led by U.S. in his reports to the Congressional Research Service. These cost estimates were based on military expenditures, and they do not include veteran benefits, interest paid on funds borrowed for war financing, and funds spent on the assistance to the U.S. allies (Daggett, 2010, p. 1). He reports these estimates

in "current year dollars," inflation-adjusted "constant dollars" for the fiscal year 2011 as well as in percentage of Gross Domestic Product (GDP) for the year where conflict and United States' overall defense spending peaked (Daggett, 2010, p. 1). During the Vietnam War, Daggett (2010) reported that the U.S. government had spent over \$738 billion inflation-adjusted "constant dollars" for the fiscal year 2011 (Daggett, 2010, p. 2). From the U.S. perspective, the Vietnam War was less expensive than World War II, whose total military cost 4,104 738 billion inflation-adjusted "constant dollars" for the fiscal year 2011 and more expensive than the Korean War and World War I (Daggett, 2010, p. 2). When observing the cost of war as a percentage of GDP in the peak year of the war, the Vietnam War had the lowest percentage of 2.3% when compared to World War I, World War II and Korean War. The cost of Korean War reached 4.2% of GDP in the peak year of the war while World War I and World War II war cost was 13.6% and 35.8% of GDP during the peak years of these conflicts (Daggett, 2010, p. 2). The long-lasting Vietnam War was exhausting for the United States' economy because it was a great outlay to the U.S.

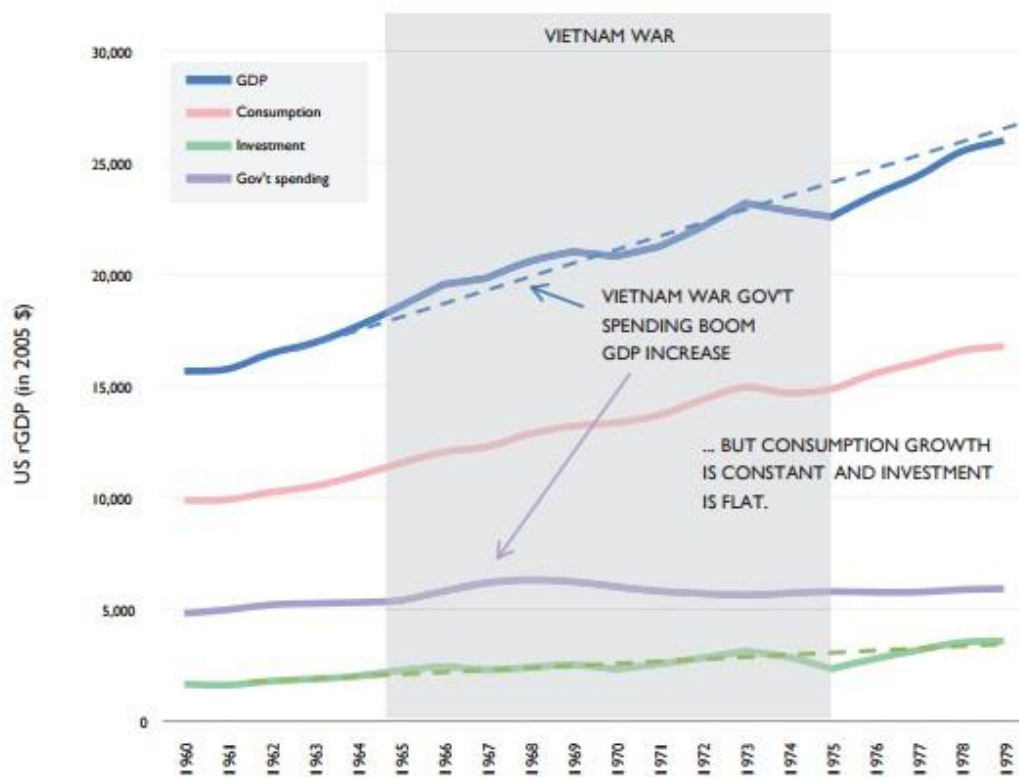
The Vietnam War is considered to be one of the most important factors for the slowdown in the American economic growth in the 1960s. The impact of war on the U.S. economy was more drastic than just causing an economic decrease. Just after the Vietnam War finished and U.S. troops retreated, the United States economy suffered from an extremely large crisis in the 1970s. Scholars in politics and economics argue that the U.S. involvement in the Vietnam War was, at least for some part, responsible for the beginning of the 1970s economic crises. Most of the Vietnam War was not funded by borrowing money from the public. The majority of the funding, 65 percent, came from the expansion of the money supply by the Federal Reserve (Daggett, 2010, p. 2). Only

fifteen percent of the Vietnam War was funded by domestic debt, and 20% was funded through taxes. Even though an increase in taxes was avoided initially, the government decided to raise taxes in 1968 to pay for the war that was longer than anticipated (Labonte & Levit, 2008, p. 9).

Cappella (2012), however, argues that the public opinion was responsible for shifting away from taxation to debt and expanding the money supply for funding the war. "Public opinion was so low that it shifted President Johnson's war finance strategy away from taxation and towards less visible means of domestic debt and printing, resulting in painfully high inflation" (Capella, 2012, p. 61). Labonte and Levit (2008) argued that shifting towards expanding the money supply for war financing purposes caused high inflation levels after the war ended. Since this government expenditure was used to cover both military and non-military outlays, it is difficult to separate the direct effect that the Vietnam War had on the budget deficit. However, the military buildup and its expenditures seen during this period are the biggest indicators of the war's impact on the economy. Daggett (2010) noted that during 1968, the U.S. spent 9.5% of its GDP on military costs (p. 2). In 1968, the Vietnamese conflict and cost of war to the U.S. peaked. Small military buildup accompanied economic expansion during Vietnam War. Economic growth, as a consequence of an increase in government expenditure, can be seen in Figure 6. Military buildup during wartime typically boosts aggregate demand (Shank, 2011). Reduction in defense expenditures after a war typically causes a brief economic shrinkage as the economy adjusts to return to peacetime activities. Scholars such as Koubi (2005) argue that major characteristics of wars such as war severity, intensity and duration have a positive economic impact (p. 69). In his study, Koubi (2005) measured war severity as a number of battle deaths, intensity as the number of

deaths that in battles per month, and duration as number of months that the United States was involved in a war (Koubi, 2005, p. 73). Findings show that war severity and duration have a positive impact on the economic growth during the war (Koubi, 2005, p. 75). The total output of the country produced increases during war as specific industries, such as technology, increase their production for war purposes. This study explains why there was an upward trend in GDP during Vietnam War.

**Figure 6: Government Spending for Vietnam War**



Source: Shank, M. (2011). *Economic Consequences of War on the U.S. Economy*.

Institute for Economics & Peace.

Once the war ended, the United States experienced great levels of budget deficit and inflation. Critics hold that this was caused by high military expenditure and the increase in money supply. The interest rates rose as well. The increase in interest rates

was a result of Nixon's policy to establish price controls in order to suppress inflation. As Labonte and Levit (2008) noted that "rather than further tighten monetary policy or fiscal policy to weaken aggregate demand, President Nixon responded with the imposition of price controls in four phases from 1971 to 1974. Under the Nixon program, prices, wages, and profits were controlled for all large firms" (p. 10). President Nixon implemented price controls in four phases during which the measures would be gradually reduced. The goal of these price controls was to restrict the amount of capital that businesses and consumers could access (Labonte & Levit, 2008, p. 11). The measurements targeted corporations and labor unions while small firms did not have to comply with price, profit, or wage controls for some phases. To decrease inflation the government also decreased military spending and government expenditures between 1969 and 1973 (Shank, 2011, p. 12). As it can be seen from Figure 6, consumption and investment remained flat or constant during the Vietnam War. After the Vietnam War ended, the U.S. economy experienced an "energy crisis" and stagflation, which is a period of high inflation and unemployment levels and low economic growth (Labonte & Levit, 2008, p. 11). The government's policy to decrease inflation and unemployment rates after the Vietnam War, in contrast, decreased economic growth. To sum up, while the Vietnam War had a positive impact on the economy during the war, the American economy experienced negative effects after the war ended because of the increase in money supply and budget deficit.

As the conflict progressed, the investors and financial markets were less affected by conflicts and battles in Vietnam. As Ferguson (2008) argued "Vietnam never threatened to become a world war; its primary economic significance was in loosening American fiscal and monetary policy and sowing seeds of higher inflation. Likewise, the

Middle Eastern conflicts of the 1970s were interpreted by investors primarily in terms of their inflationary impact, rather than their potential to escalate to Armageddon" (p. 472). Investors paid great attention to domestic monetary and fiscal policy. These policies were their main subject of observations as they hoped to improve their predictions in financial markets. Uneven inflation rates during the Vietnam War decreased the accuracy of investors' predictions and estimations (Shank, 2011, p. 11). During this ten-year long war, the Dow Jones Industrial Average Index fluctuated. High inflation, Nixon's price controls policy, and the oil shock depressed the financial market, and the DJIA index stagnated throughout the period. The price of the DJIA increased only after the jump in stock prices after 1980 (Shank, 2011, p. 11). Thus, returns from the equity markets were worse during the Vietnam War than the full period or full market cycle average. In conclusion, many scholars say that Vietnam War had some negative effects, having ushered in a decade of both high inflation and economic stagnation in most of the Western World.

## *II. Lebanon War*

The war in Lebanon started on June 6, 1982, between Israel Defense Forces and Palestine Liberation Organization in southern Lebanon (Office of the Historian, 2013). It was not until September 29, 1982, however, that President Reagan sent American troops as he feared that the conflict could evolve into Arab- Israeli War (Office of the Historian, 2013). The United States troops withdrew from Lebanon February 26, 1984 (Office of the Historian, 2013). Initially, the United States troops were sent to Lebanon by President Reagan's unilateral authorization. As reported by the U.S. Department of State, Office of Historian, "Reagan's administration was divided over how to respond to Israel's invasion" (Office of the Historian, 2013). Even though these disagreements were substantial,

Reagan ignored them by sending U.S. troops as part of three-nation peacekeeping force, including troops from France and Italy. "On September 29, Congress passed legislation invoking the War Powers Act and authorizing the Marines to remain in Lebanon for 18 months, the first time constraint placed on their presence" (Office of the Historian, 2013). The war in Lebanon is considered to be an example of Congress applying the War Powers Resolution with ex-post authorization for a limited war of maximum 18 months. If the president had failed to invoke the Section 4(a)(1) of the War Powers Resolution, Congress would have stopped funding the military actions in Lebanon. The announced goal was to secure restoration of the Lebanese government sovereignty by guaranteeing withdrawal of Palestine Liberation Organization (Fisher, 2000, p. 67). "What began as a humanitarian, peacekeeping, noncombatant mission deteriorated into war, stretching from its initial 30-day commitment to almost two years" (Fischer, 2000, p. 68).

While the United States suffered significant losses in lives and resources, there is no data showing the exact financial costs or military spending during this period. The *New York Times* (1984) reports that "the estimated participation in the Multinational Forces for fiscal year 1984 was a total of \$14.6 million for the U.S. Marine Corps deployment, \$44.9 million for U.S. Navy support and \$243 thousands for U.S. Army support." Compared to the Vietnam War and previous U.S. involvement in military conflicts, this cost was low. It is unlikely that funds for this military outlay were acquired through additional taxes because the Economic Recovery Tax Act of 1981 was enacted towards the end of August 1981, which was less than a year before the U.S. troops were sent to Lebanon (Labonte & Levit, 2008, p. 14). This act was created in order "to amend the Internal Revenue Code of 1954 to encourage economic growth through reduction of the tax rates for individual taxpayers, acceleration of capital cost recovery of investment



in plant, equipment, and real property, and incentives for savings, and for other purposes" (Public Law 97-34, p. 1). Starting a war in 1982 was unfavorable because of this act and economic recession that was worse than the average of post-World War II recessions. Towards the end of 1982, the U.S. economy also witnessed extremely high inflation rates reaching the post-World War high of 10.8 percent (Miller, Mitchel, & Hoxworth, 1983, p. 5). The U.S. economy began to recover in 1983, from the 1970s energy crisis. This was several months after the war in Lebanon started, but it is not possible to distinguish the impact of war on the economy from the implications of the 1981 Economic Recovery Act. The civilian unemployment rate dropped steadily, reaching 8.4 percent in November 1983 (Miller, Mitchel, & Hoxworth, 1983, p. 5). Rapid growth through 1983 was followed by even more rapid growth in the first half of 1984, accompanied by further declines in the unemployment rate and continued moderation in inflation. After mid-1984, economic growth slowed significantly and the unemployment rate leveled off while inflation remained moderate (Miller, Mitchel, & Hoxworth, 1983, p. 5). Early in the year, there was a rapid increase in the interest rates and money growth which was followed by decreasing interest rates and slow money growth. Monetary policy was implemented in 1984 against inflation and towards continued growth in the economy at a sustainable pace.

Again inflation affected financial markets and the share prices were rising on average. While stock prices were undervalued in the 1970s, the U.S. stock market entered on August 1982 one of the longest bullish periods since its creation. Many scholars argue that during the U.S. involvement in the Lebanese War, the financial markets recovered from "inflation-induced valuation errors" that were created before the war (Ritter and Warr, 2002, p. 30).

### *III. Persian Gulf War I*

The Persian Gulf War, also known as Operation Desert Storm, was an international conflict that began after Iraq struck Kuwait on August 2, 1990, and ended February 28, 1991 (Fisher, 2004, p. 9). It was the briefest full-scale conflict in the history of United States. The United States intervened in this dispute as it did not approve the invasion of Kuwait by Iraq's leader, Saddam Hussein. His immediate goal was to conquer the nation's mass oil reserves, expand the power of Iraq in the region and remove a debt that Iraq owed to Kuwait (Joyner, 1990, p. 10). The coalition force authorized by United Nations consisted of NATO allies and the Middle Eastern countries of Saudi Arabia, Syria and Egypt. This coalition was U.S.-led. Its formation was officially authorized by the United Nations Security Council on November 29, 1990, where it was approved to use of "all necessary means" in a war against Iraq (Joyner, 1990, p. 10). While the United Nations authorized the use of force earlier, it was not until January 14, 1991, that the U.S. Congress approved the use of U.S. military force by passing the "Authorization for Use of Military Force against Iraq Resolution" (Fisher, 2004, p. 9). Even though the authorization came late, the Persian Gulf War I had the most explicit authorization since the Vietnam War and Tonkin Gulf Resolution (Tucker, Roberts, & Zinni, 2010, p. 343).

The Congressional Research Service and the United States Department of Defense estimated that the cost of the Persian Gulf War I was 102 billion "real dollars" for the actual fiscal cost in the year 2011 (Daggett, 2010, p. 2). The conflict occurred at the end of "Cold War" which was the time when United States government was reducing military expenditure as a percentage of GDP. This was one of the few military operations that did not affect the budget. The peak year for military spending during the Gulf War was 1991, where war needed only 4.6% of its GDP for war financing that year (Daggett,

2010, p. 5).

Another reason this operation did not require much funding from the U.S. government is the fact that the U.S. received many financial contributions for the Gulf War from its allies. "During the 1991 Gulf War, the U.S. received huge subsidies from Germany, the Gulf states, Japan and Saudi Arabia to help pay for the cost of evicting Saddam Hussein from Kuwait" (Roach, 2003, p. 10). Critics hold the U.S. earned a profit from participating in the Gulf War as the country funding from their allies in the multinational force for their military material. These contributions from foreign governments equaled to \$48 billion while the overall cost of the war was \$61 billion in current nominal dollars (Smith, 1989, p. 347). In the balance of payments from 1990 to 1992, which is an official statement that reports all of the economic transactions that the United States had with the rest of the world, these contributions represented a single, one-way, transfer to the United States and were recorded as a reduction in the current account deficit. Ultimately, these transactions had no effect on the exchange rate, since the largest amount of funds came from Saudi Arabia and Kuwait which had de facto fixed exchange rate with the U.S. dollar.

During the Persian Gulf War, the budget deficit increased. It is debatable, however, whether the Persian Gulf War was behind this since there was a decreasing trend in the military spending. Labonte and Levit (2008) argued that increase in budget deficit resulted in "falling tax revenues, and rising non-military outlays, both of which can be largely accounted for by automatic changes in revenues and outlays caused by the economic slowdown" (p. 14). The Omnibus Budget Reconciliation Act of 1990 cut discretionary spending and increased taxes (Labonte & Levit, 2008, p. 14). This act was an attempt to secure long-term growth of the American economy. Most of the cuts in

spending were in the military and Medicare area. "The revenue raising provisions of the act were estimated to raise tax revenues by 0.3% of GDP in 1991" (Labonte & Levit, 2008, p. 14)

According to Congressional Research Service report by Labonte and Levit (2008), the Persian Gulf War had adverse effects on the U.S. economy. During this period, the United States economy underwent a recession, which started in July 1990 and ended March 1991. While scholars hold that recession of 1990 did not directly influence the war, there is a possibility that war decreased consumer confidence (Labonte & Levit, 2008, p. 13). While this recession was influenced by an event called Black Monday, when various stock markets around the globe plunged, many scholars thought that the recession was a sign that investors were worried about large amounts of budget deficits. Other causes of this crisis were considered to be the Iraq's invasion of Kuwait and Federal Reserve's contractionary monetary policy designed to increase interest rates.

During the Persian Gulf War I, the U.S. government had to choose whether to fight the recession or get rid of the inflation caused by a rise in oil prices. The spike in oil prices in 1990 is correlated with the recent invasion of Kuwait by Iraq. "After the loss of Iraqi and Kuwaiti supplies, oil prices initially soared from a pre-invasion average price around \$18 a barrel to slightly above \$40 by the late fall" (Silk, 1991). However, Silk (1991) stated that the oil prices "fell back to roughly \$21, as numerous shipments came in from other producers, and world oil demand lagged." Some of the industries that were negatively affected during this period were the airline industry because of the rise in fuel prices. The Persian Gulf War had a negative effect on consumer confidence and business spending. After the war had ended, the economy began to expand, and there was no sign of the previous contradiction. Levkovich claims that "the market cheered the Gulf War

partially because decisive victory came at relatively low cost to American lives" (Waggoner & Shell, 2002).

There were different views on the global and domestic economic impact of the Persian Gulf War. The war was not considered to pose any danger to the world economy and cause a global recession unless it evolved into a long-lasting or large-scale war. Lester Thurow, a professor of economics at the Massachusetts Institute of Technology, said at the annual World Economic Forum meeting in Switzerland that the Gulf War is a less significant economic war because it is an "inventory war" (Heilbroner & Thurow, 1998). Nearly three weeks into the Persian Gulf War, political and economic leaders believed that the conflict would only have limited impact on a world economy already expected to slow down this year. On the other hand, the Gulf War was considered to have triggered or at least intensified the American economic decline.

Right before United States' invasion, Alan Greenspan, chairman of the Federal Reserve, warned of the potential dangers of recession and said that the Federal Reserve was prepared to ease credit, if necessary, to prevent a recession. However, other economists said before the Gulf War started, that the Fed had been too tight and was endangering a weak economy. Director of the President's Council of Economic Advisers at the time, Michael J. Boskin, is quoted as saying that "as the Gulf War tipped the economy into recession, its end helped stop the recession and start the recovery. The council is forecasting 3.6 percent real economic growth in 1991" (Silk, 1991).

The Persian Gulf War I was criticized for pushing the United States economy towards a recession (Silk, 1991). While this war is considered to be a quick victory, the Iraqi invasion of Kuwait produced an unfavorable psychological response in stock prices and consumer attitude. One factor for the decrease in stock prices, intensification of

inflation and recession was the disruption in oil markets (Silk, 1991). Even though the 1990s oil crises was not extreme, the oil prices initially increased from \$18 to \$40 per barrel by the fall in 1990 (Silk, 1991). This oil price increase affected many industries in the United States, such as airlines. Businesses decreased the amount of investment, which lowered the valuation of their stocks by investors. These factors depressed consumer spending while defense spending did not make for it. The outcome was uncommon for United States wartime in modern history. The sudden recession began one month after the Iraq invaded Kuwait.

#### *IV. War in Afghanistan/ Operation Enduring Freedom and Iraq (War on Terror)*

Operation Enduring Freedom began as an international military operation against terrorism on October 7, 2001, which was quickly after the September 11, 2001, terrorist attacks (Tucker, Roberts, & Zinni, 2010). Close allies, such as United Kingdom, Australia, and Canada, supported the United States in this operation as well as NATO that joined in 2003. Their immediate goal was to remove Al-Qaeda and Taliban groups from power in Afghanistan. Even though NATO formally ended combat operations on December 28, 2014, and the United States transferred full responsibility to the government of Afghanistan, U.S. troops are still in the process of withdrawal from the Afghanistan soil today (Tucker, Roberts, & Zinni, 2010). Thus, the war in Afghanistan is considered to be an ongoing conflict. Even after the end of Operation Enduring Freedom, in December 2014 the United States military forces still continued their military operations, this time functioning under a different name, Operation Freedom Sentinel. The use of force in this war was approved by Congress through a resolution called "Authorization for Use of Military Force" that was passed on September 14, 2001 (Tucker, Roberts, & Zinni, 2010). This resolution authorized the president to "use all

necessary and appropriate force against those nations, organizations or persons he determines planned, authorized, committed or aided the terrorist attacks that occurred on September 11, 2001" (United States Congress, 2001, p. 1).

As this war was a long-lasting war, it is hard to determine the exact impact that the war had on the economy and financial markets. The United States, however, spent many resources to conduct this war. Since this was a serious issue that affected the whole nation, Congress authorized immediately much bigger funds towards counterterrorist operations. Daggett (2010) noted that until 2010 the United States spent in total \$1,046 billion on military outlays in Iraq or Afghanistan after 9/11 Terrorist Attacks (p. 2). The year of 2008 is considered to be the peak year of conflict and defense spending in Iraq or Afghanistan from 2001 until 2010. The government spent around 4.3% of its GDP on financing military expenditures only (Daggett, 2010, p. 1). Scholars, such as Stiglitz and Bilmes (2011) argued that, after accounting for the associated costs that were omitted in the Congressional Service Report, the cost of conducting Operation Enduring Freedom was more than three trillion dollars (Stiglitz & Bilmes, 2011). The most recent critics hold that the total costs of wars in Afghanistan and Iraq are more than four trillion dollars (Farber, 2015). Just like the Persian Gulf War I, this war began with a recession in the United States. While this war was not responsible for the crisis, it impacted the recovery by slowing it down.

Because of the weak economy, the United States used other ways of financing for the war. Unlike the Vietnam War, which was financed by increases in taxes, this war was funded by raising debt. Instead of raising taxes, this was the first war that started with the government lowering the tax rates. The goal of this was to avoid protests and keep the public satisfied and supportive of the war (Bartlett, 2009). Even though the government

did not expect that raising debt will impact the current weak economy, increase in debt ended up raising deficits. Higher deficits resulted in higher debt, higher debt-to-GDP ratio, and higher interest rates. The widening of the budget deficit usually stimulates aggregate demand during wartime, but since military spending increased at a constant rate each year, the effect was negligible. Apart from these effects, increasing the deficit had many adverse effects on the economy as well. Despite the increases in military spending and deficits, the inflation and interest rate levels did not increase in the beginning. They remained flat until the end of the recession. Since this was a long-lasting war, there were occasions when interest rose, such as between 2005 and 2009. During this period, the government also attempted to use taxes for financing the war. Labonte and Levit (2008) noted that the reason for United States revenue increase from 2005 until 2007 was a result of "rising taxable income generated as a result of strong GDP growth, contributing to lower deficits and allowing the war to be financed through this increase in revenues" (Labonte & Levit, 2008, p. 16). The slowing economy in 2008 decreased incomes and the United States went back to funding the war through deficit. After 2009 and the recession caused by the housing bubble, interest rates had a decreasing pattern. On the other hand, the level of unemployment increased significantly towards the fourth quarter of 2009.

"While the Dow Jones index plunged 6.31 percent following the invasion of Kuwait by Iraqi troops in 1990, it gained 17 percent in the first four weeks of Operation Desert Storm" (Schnieder & Troeger, 2007, p. 624). Stiglitz and Bilmes (2011) claimed that this war "played a direct role in increasing the cost of oil which went from \$23 a barrel just before the war to \$140 at its peak" (p. 16). A weak economy concealed the inflation rates in U.S. policymakers started using fiscal policy to improve the state of the



economy just before the Global Financial Crisis in 2008. With this fiscal policy, "the Federal Reserve carried the burden of keeping the economy growing, which it did via low interest rates, a flood of liquidity and lax banking regulations which in turn helped fuel the housing bubble" (Shank, 2011, p. 12).

If compared to figures from World War II period, defense spending remained moderate during Wars in Afghanistan and Iraq. Teslik (2008) argues that, apart from defense spending, there are other collateral economic consequences such as international debt accrued to sustain war, volatility in the global and domestic oil markets which is widely attributed to conflicts in Iraq and Afghanistan, and the geopolitical uncertainty resulting from this war. Experts disagree on whether U.S. war spending in Iraq and Afghanistan will have a positive or negative impact on the economy in the long run. While Douglas Holtz-Eakin, former director of CBO and advisor to former presidential candidate Senator John McCain said that this war has an effect on the "business cycle if it caused higher oil prices, slower U.S. growth and diminished global income" (Holtz-Eakin, 2006). On the contrary, Martin Feldstein, an economist from Harvard and economic advisor to President Reagan, claimed in 2002 that the United States can slightly increase the budget without it having a negative effect on the economy (Teslik, 2008).

Political scientists consider this war to be "prolonged conflict" where there are a wide variety of complications and additional costs. Garten (2004) argued that "the biggest danger, and the most difficult to quantify, is that a long and arduous war will add to the investor and consumer unease that has already been building in many parts of the world, particularly in the middle class in America and Western Europe." The length of the conflict and additional resources used in wars that last longer than expected should make a bigger impact on the economy.

## **Conclusion**

Two types of wars led by the United States, congressionally authorized wars and unilateral acts by the president, determine the length of the war as well as the costs.

Based on the type of war, the United States must choose between three primary ways of war funding: taxation, issuance of T-bills to the public or creation of money. Each of these methods of war financing has different political and economic effects. Wars financed through taxation are politically unpopular, but this method tends to fight inflation and minimize costs. Issuing T-Bills can cause higher dependence on foreign countries but can disguise the direct costs of war to the public. Thus, the method for war finance depends on different factors such as public and legal war support, current economic condition, war intensity and the duration of war. These factors consequently determine whether the war will have a positive or negative impact on the economy. Because most of the wars since 1960 were financed by issuing T-bills to the public, the effect on the U.S. economy was positive during the war. Critics hold, however, that after the war ends, the risk of recessions and stock market crises is increased.

### **Chapter 3: War and its Impact**

Economic causes and consequences of war have received widespread attention from scholars, and there is only limited research done on how war affects the stock market. Most studies conclude that the consequences of war on the financial market are substantial. However, there is a divide in literature as to whether war and movements in Dow Jones Industrial Average index are negatively or positively related, with the reasons stemming from differing empirical approaches, different datasets over different periods, and the use of various descriptive variables. To explain the conflicting stock market reactions to war the chapter will observe the impact of the war during different stages: pre-war period, war period and post-war period. Apart from this, short conflicts such as terrorist attacks will be analyzed as well.

#### **War as a shock**

The literature on the behavior of financial markets has shown that equity markets experience different shocks. Shocks are considered to be periods "when unanticipated volatility in U.S. stock markets was exceptionally high in statistical terms" (Mehl, 2013, p. 2). The European Central Bank divides the shocks into two categories based on their nature: economic and non-economic (Mehl, 2013, p. 2). The economic shocks on financial markets are fiscal and economic crises, economic policies, financial market panics and concerns over economic policies and government responses to crises. Some examples of the non-economic shocks are terrorist attacks, wars and other political shocks. Mehl (2013) sees non-economic shocks to be exogenous in nature, meaning that their shocks origin is outside the U.S. borders. Economic shocks originate inside the U.S. and thus are endogenous to the U.S. financial markets. To other foreign markets, the U.S. commercial shocks are exogenous in nature. Mehl (2013) also looked at the wartime

events as exogenous developments that can become relevant for the financial markets (p. 2). The United States has fought all of its wars on foreign soil since the end of the American Civil War in 1865. Despite war shocks originating outside the U.S., the location of conflicts still matters.

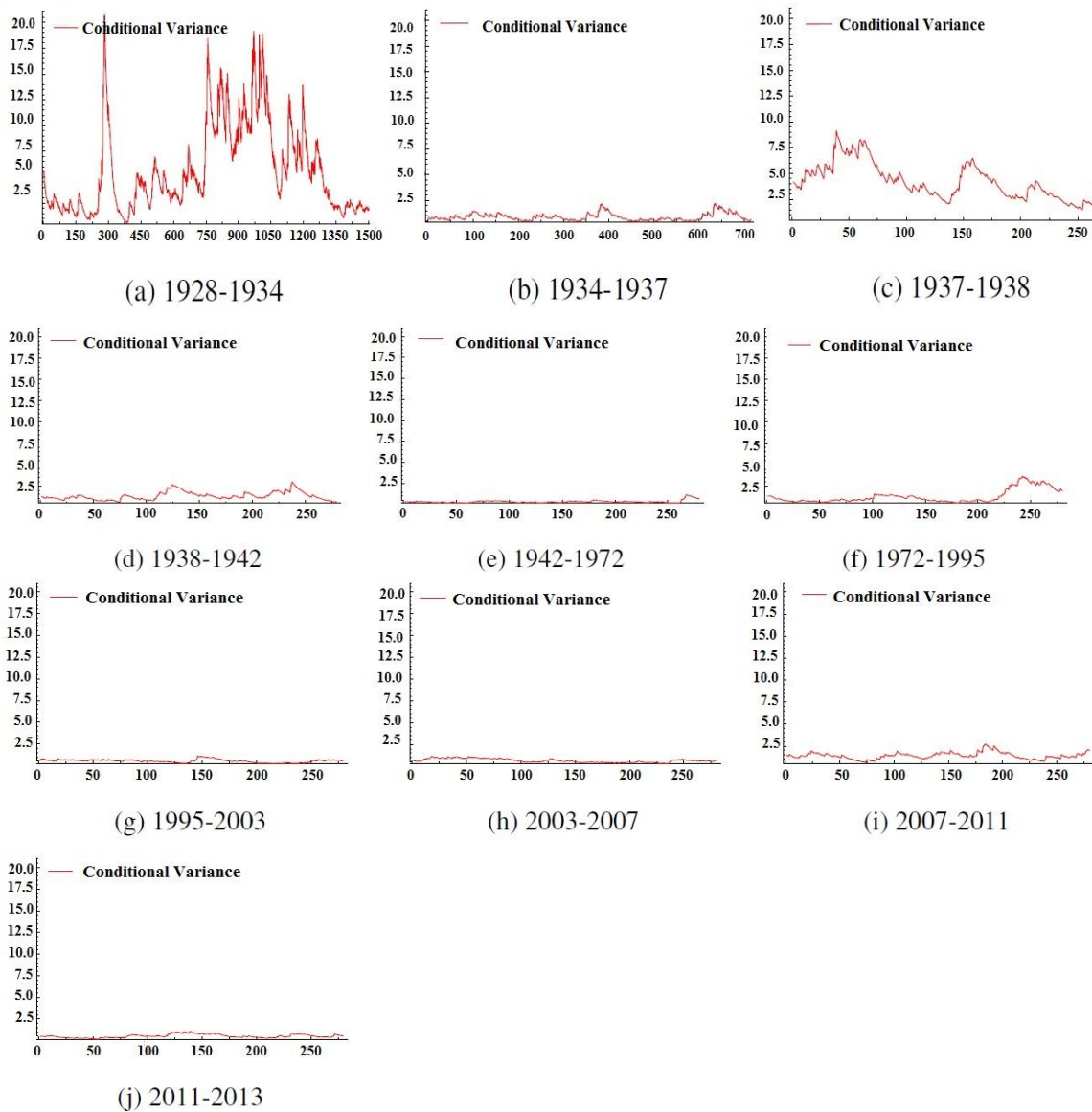
Taleb (2007) argued that the war events belong to a type of shock that is called a "black swan," a term used to describe any event that differs from the standard expectations about a situation and that would be tough to predict (Taleb, 2017, p. xvii). Outliers, such as wars, have an extreme impact on market returns. They are outside of the scope of general expectations, meaning that nothing from the past is indicating that a "black swan" will occur in the future. After the occurrence of a "black swan," it is possible to find justifications that make the events explainable and predictable (Taleb, 2007, p. xvii). Thus, when looking at these events retrospectively, Taleb (2007) did not consider the war events to be a surprise. To explain how the term "black swans" represents wars, Taleb (2007) looked at multiple war events (such as Lebanese War, September 11, 2001, World War I and terrorist attacks).

The effect of "black swans" was measured by looking at financial market performance indicators. Charles and Darne (2013) expanded on Taleb's research and used the Dow Jones Industrial Average index to look at the effect of wars, bankruptcy and terrorist attacks on financial markets. They consider these three events to be "black swans." To identify the "black swan" events, Charles and Darne (2013) took a particular approach to the identification process (p. 188). Unlike Taleb (2007), who looked at qualitative criteria for the identification process, Charles and Darne (2013) used a quantitative technique to identify these outliers (p. 190). Their categorization of the war shocks can be viewed as more reliable than Taleb's since it satisfies the research goal of

detecting the biggest outliers in the period and can be reproduced again with similar results. Charles and Darne (2013) used two techniques: intervention analysis and event study methodology (p. 192). The event study methodology is used to identify and measure the impact of an event on security prices and stock returns (MacKinlay, 1997, p. 14). With this method, all of the abnormal returns generated from the difference in stock prices are attributed to the event. By using the intervention analysis approach, researchers were able to estimate the effect of the known and unknown events in a time series data (Charles & Darne, 2013, p. 191). In their study, they observed these "black swan" events that cause large shocks to financial markets through changes in the volatility of the DJIA index in the period between October 2, 1928, and August 30, 2013 (Charles & Darne, 2013, p. 195). The iterative cumulative sums of squares (ICSS) algorithm proposed by Inclan and Tiao (1994) was used by Charles and Darne (2013) to identify sudden shifts in the volatility of the Dow Jones Industrial Average index. After the identification of the volatility changes, they studied the effect of "black swans" by using a new semi-parametric test based on the conditional heteroscedasticity model. The findings from their research show that large shocks occur mostly because of the events such as financial crashes, US elections, wars, monetary policy during recessions, macroeconomic news and declarations about the economic situation, terrorist attack, bankruptcy and regulations (Charles & Darne, 2013, p. 193). The occasions where "black swans" did not have an impact on financial markets were justified by the fact that the events occurred during the period of high market volatility (Charles & Darne, 2013, p. 191). As these large movements occur due to investors' perception of the shocks, the changes in the percentage of market return have different consequences and perceptions when the market is within a high volatility period compared with a low volatility or stable period.

The percentage change in performance, caused by a shock, can be considered a significant shock when the market is experiencing low volatility. The shock can also indicate an insignificant effect during the high volatility periods in the market. Thus, some shocks were not identified as unusual movements, especially in the high volatility periods such as 1929-1934, 1937-1938 and 2007-2011 (Charles & Darne, 2013, p. 195). Figure 7 depicts both high volatility and low volatility changes in DJIA in the period from 1928 until 2013. It shows a conditional variance of the U.S. financial market for each of the sub-periods. Consequences of "black swans" and investor's perceptions differ from periods of high to periods of low volatility and thus it is critical to consider instability of the period prior assessing the effect of the extraordinary shock such as war. The volatility of stock returns increases when the economy enters a state of recession. "Episodes of higher volatility which occurred in the 1929-1934 and 1937-1938 periods, with a standard deviation of 0.020, present at least twice the volatility as the other periods" (Mehl, 2013, p. 22). However, this high volatility can also be attributed partially to political uncertainty. The period between 2007 and 2011 experienced lower levels of volatility than the period between 1929 and 1924. However, the volatility remained relatively high for a longer period.

**Figure 7: Conditional Volatility of DJIA, 1928-2013**



Source: Charles A. and Darne O. (2013). Large shocks in the volatility of the Dow Jones Industrial Average index: 1928-2013, *Journal of Banking and Finance*.

Apart from the Dow Jones Industrial Index, other indicators were used to measure the effect of war on financial markets. Researchers made decisions on which parameters to use based on their field of practice and intuition. For example, Shank (2011), an economist from the Institute for Economics and Peace, looked at the relationship between

government spending and war since World War II. His study looked at the macroeconomic effects of WWII, the Korean War, the Iraq/Afghanistan Wars and the Vietnam War. To analyze the effect of wars on the economy of the United States, Shank (2011) used economic parameters and indicators such as GDP, public debt, levels of taxation, consumption and investment as a percentage of GDP, inflation, income distribution and average stock market valuations (Shank, 2011, p. 4). All of these indicators were affected by government policies associated with funding these conflicts. According to Keynes, an increase in government spending increases Aggregate Demand and consumption, which raises levels of productions and accelerates recovery from recessions. "The expansion in government spending shifts the demand schedule facing each firm, and thus the possibility of selling more output at an unchanged price" (Gali, Lopez-Salido, & Valles, 2002, p. 19). Government spending is also an element of GDP, which is one of the primary indicators of the state of the economy. Government spending during war periods increases since the state is funding for military actions through various government policies, such as increasing the public debt and levels of taxation. Shank (2011) defined this increase in government spending as "conflict spending boom" that generates positive economic benefit in the short-term period (Shank, 2011, p. 5). Despite having a positive impact on the economy, the effects that war has on financial market are more mixed. "During World War II stock markets did initially fall but recovered before its end, during the Korean War there were no major corrections while during the Vietnam War, and afterward stock markets remained flat from the end of 1964 until 1982" (Shank, 2011, p. 4). When looking at wars as a whole, there was no consistent pattern of effect across various events. Thus, Shank (2011) went a step further and discovered that the impact of the war was negative on stock prices for a period before the



markets recover from the shock. "In 14 shocks dating (back) to the attack on Pearl Harbor in December 1941, the median one-day decline has been 2.4%. The shocks, which also include the September 11th terror attacks and the 1962 Cuban missile crisis, lasted eight days, with total losses of 7.4%... The market recouped its losses 14 days later" (Shell, 2014, March 3).

Another important observation from Shank (2011) is that short-term shocks to the system cause short-term consequences for the stock market and the economy. The impact of short conflicts, or terrorist attacks such as September 11, is short-lived. "As such they shouldn't change an individual's investment philosophy or cause one to "abandon ship" (Aune, 2014, p. 5). On the other hand, crucial periods of conflict, such as wars between the United States and another country or World Wars, can have more lasting effects on the economy and the stock market. "A more prolonged conflict may cause an individual to take a more judicious approach by reevaluating his or her goals and making adjustments based on the current market environment" (Aune, 2014, p. 5). Thus, Shank (2011) and Aune (2014) classify the impact of war based on the duration or type of war. A crucial component while analyzing the impact of war is time. Based on the period that a researcher is looking at, the indicators of financial market performance, such as Dow Jones Industrial Average index, vary. Dow Jones Industrial Average index is a time-tested measurement of the market that changes with fundamental market trends. Thus, to get a more detailed analysis of the stock market performance pre-war, during the war and post-war periods will be observed.

### **Pre-war period effect**

The pre-war period here is the period before every war in the history led by the United States. From Gordon's (1986) perspective, the average duration of the prewar

period is considered to be around ten years before the war starts. However, there is no precise time frame which defines the pre-war, and it varies from one war case to another. This definition of pre-war period is different from a standard definition by which pre-war, or antebellum, is a period before the most significant or most recent war in the history of culture (Thompson, 2015, p. 64). Unlike observing the social or political system change, researchers have looked at the pre-war period to see whether it brings a change to the financial market in the United States. It can be argued that this pre-war period is a phase of "normal" state of affairs which is in contrast to the postwar period of "exceptional" price stickiness (Gordon, 1986, p. 668). Financial markets are considered to be in the natural state of affairs when they reflect all publicly available information. Thus, the efficient market hypothesis is a representation of the normal state. As stock prices reflect all available information, according to the efficient market hypothesis, they do not react quickly to news. This delayed reaction indicates that the prices are not sticky in the period where financial markets are efficient (Gordon, 1986, p. 668). One must be careful with this statement since there is limited evidence of price stickiness in the prewar period as well. To investigate the effect of war on United States' financial market, two types of information sources were used: history and news. Because the data on war is limited in the prewar period, the measurement error has to be taken into consideration when looking at any study conducted in the prewar period.

Since current market prices reflect complete knowledge and expectations of investors, any information released to the public influences the prices. In the prewar period, when there is no accurate information people get affected by the common perception in the investment world. Investors create common perception when relevant information to financial markets is perceived by investors with senses instead of as they

are. These acts of perceiving in the investment world can become reality. Conflict developments or situations from the past are a base for investors' perceptions of present conditions and circumstances. That is why history is important in the financial markets. The lessons that investors extract from history about the impact of the major geopolitical shocks on financial markets influence their investment decisions made in the present (Ferguson, 2008, p. 431). Ferguson (2008) looked at two financial markets, the London and New York market for bonds, stocks, currencies and commodities during three major wars: the First World War, Second World War and early Cold War. He compares the behavior of investors during these world wars to see whether the previous war impacted the future one. This study done by Ferguson (2008) is more of a qualitative study of the effect of war on the financial markets, rather than a quantitative study. His exploratory research provides the reader with an insight into the war shock and helps the reader to understand the importance of wars for the investors and financial markets.

Throughout his research, Ferguson (2008) investigated the importance of political risk, which is a component of war. Political risk is a type of risk that investors, governments or corporations bear when there is a potential that investment returns will be affected by instabilities or political changes in a country. The risk is expected to increase once the country enters a war. Ferguson (2008) investigated whether the political risk in financial markets in the past can explain the way past wars effect on the developments in the present. Unlike other researchers, Ferguson (2008) argued that political risk should be taken into consideration when investigating financial markets during wars and economic crises, even though the financial crisis frequently occur for no geopolitical reasons (p. 436). The increase in political risk increases market volatility and reduces investment because war announcement influences the overall suitability of a destination for

investment. His theory of why political risk is an important factor when analyzing the effect of war on financial markets comes from his analysis of similarities between the world in 2008 and the world in 1914. In 1914 and 2008, the U.S. economy was exceedingly more integrated with the international economy, which meant the free movement of labor, goods, and capital. According to Ferguson (2008), both the crisis in 1914 and 2008 “prompted the issue of emergency paper money by the national treasury” (p. 448). Apart from similarities in the economy, the world experienced some radical and capitalist ideologies and terrorist movements, as well as regimes willing to sponsor terrorism with the hopes that the great powers might come into conflict with less powerful states (Ferguson, 2008, p. 448). Despite these similarities, the markets seemed to be indifferent about the political risk and the similarity to the previous war scenario. Instead, the differences between the two wars (such as technological advances, improvements in communication and free trade) seem to be more meaningful to the investor. Thus, they choose to ignore the lessons of history about the political risk and the threat to financial stability.

Lessons from the previous wars are limited to the investor because different wars use various means, technologies and techniques. For example, the World Wars were the largest and most destructive wars in the history, while the Cold War never evolved into a physical conflict between the United States and the Soviet Union. However, during the Cold War, more destructive weapons, nuclear weapons, had been developed than the ones used in the two World Wars. The core argument of Ferguson's paper is that “investors tried to learn from the history in the 1930s but they only learned how to make new mistakes, because the lessons learned from the previous wars seemed to have limited relevance to the new war” (Ferguson, 2008, p.441). According to this, investors tend to

overlook the effects of the war in history because they look and learn only from relatively recent events. They also often concentrate on fighting the last war and analyzing why the market reacted as it did rather than fighting the next one or predicting the future movements in the financial market. As a consequence of their concentration in the past, investors made numerous mistakes such as failing "to anticipate the huge liquidity crisis unleashed by the First World War" (Ferguson, 2008, p. 472). Again, Ferguson (2008) claimed that these mistakes happened because investors took into account the differences between the two World Wars and the Cold War. Shifts in military, technology and regulatory regimes reduce the relevance of experience as investors argue that different wars have a different impact on the financial market (Ferguson, 2008, p. 436). "Changes in military technology and government regulation ensured that one could never be certain that the next war would have the same financial impact as the previous war" (Ferguson, 2008, p. 472). These differences between the World War I and II and the Cold War need to be taken into consideration when looking at the investors' behavior. Even though investors looked at World Wars retrospectively, the difficulty is the small sample size of big wars and the tendency for military paradigms to shift dramatically between wars. Thus, Ferguson's arguments are relevant only to an extent because there is a great amount of speculation involved when generalizing the impact of wars of different scales.

In the prewar period, media has a causal impact on investors' perceptions and financial markets. Apart from history, news released by various media on a constant basis, also influence investors' opinions. Even though they may sound irrelevant, the professionals and financial analysts evaluate every piece of news released to the public because they can impact the financial markets. In the prewar period, speculations about potential conflict or war can be observed months before the conflict starts. Rigobon and

Sack (2005) measured the effects of war-related news on U.S. financial markets and markets reaction to information about the likelihood of war and its expected duration and success. The study observed the risk associated with war in Iraq on various U.S. financial variables using a heteroscedasticity based estimation technique. The period observed in the paper was January to April 2003. The factor that researchers called "war risk" was measured by the quantity of war-related news published on a particular date. There were 21 "war days" which are defined as dates on which the war-related events appeared to be the biggest influencers of the asset prices (Rigobon & Sack, 2005, p. 2). The sign of the news, positive or negative was not determined because of the subjectivity issue. Despite the challenge to quantify the actual "war risk," the impact of it was still observable. The econometric method used to obtain the result was homoscedasticity.

The results indicate that "increases in war risk caused declines in Treasury yields and equity prices, a widening of lower-grade corporate spreads, a fall in the dollar, and a rise in oil prices" (Rigobon & Sack, 2005, p. 3). War risk factor explained substantial portions of change in return on these financial variables. "War risk described 12 to 56 percent of the variances in the financial variables cumulative movements over the period observed" (Rigobon & Sack, 2005, p. 6). Overall, major wars would cause higher inflation which would lead to larger commodity prices (Ferguson, 2008, p. 468). In general, it has been found that, while news releases result in a rapid increase of volatility, most of the effect is short-lived and subsides within the first few minutes (Rigobon & Sack, 2005, p. 3). "War risk" did not have an effect on gold prices or liquidity premiums for "on-the-run" Treasury securities, which are the most current issues of U.S. Treasury securities (Rigobon & Sack, 2005, p. 3). The "off-the-run" treasuries refer to Treasury bonds and notes that released before the most recent issue, are still outstanding and trade

at a discount (Wilson, 2014). These on/off the run government bonds are traded based on yield and liquidity differentials. Endowment and public shocks would make these differentials bigger and increase trade. However, the price or speed of the government bonds exchange was not influenced by the "war risk" factor.

Several issues can pose limitations on the results obtained in this study. Primarily, there were complications with the measurement of the "war risk" variable. When referring to the measurement issue, Rigobon and Sack (2005) stated two problems that their paper has. The first one was that the risk is an unobservable variable since it is hard to quantify the news associated with war. The second problem is that there are factors other than "war risk" that are influencing these financial variables (Rigobon & Sack, 2005, p. 8). Because other factors of influence exist, the "war risk" factor alone may not have affected investors' behavior to change towards safer and more liquid assets. Rigobon and Sack's results show that even after including other factors, the "war risk" factor was still a substantial share of the variances of many financial variables. Apart from this, it is also difficult to interpret the "war risk" factor. Even though they were looking at the news to define the "war risk" variable, it is impossible to determine which war-related news impacted the stock market and why.

In conclusion, the effect of war in the pre-war period can be observed by using history and news. Investors take only limited lessons from history as they focus more on learning from fairly recent events. Instead, differences in military, technology and regulatory regimes of countries indicate to investors that different wars will have different effect on returns from equity markets. News from media influences the stock market by indicating the likelihood of war, or the war risk. While news may have a short-lived effect on financial markets, the effect of increasing war risk on financial markets is

positive during main conflicts.

### **During the war effect**

The period during the war has a wide-reaching impact on the public's perception of everything from their leaders to the financial markets. While studies on pre-war effect show that war affects financial markets, there seems to be no consensus among the researchers on the type of impact- positive or negative- that the war has. Numerous studies have addressed the potential impact of an ongoing war. Yet, the existing evidence on the effect on stock markets is often contradictory and the quality of empirical studies varies extensively.

One of the first researchers who studied a large number of international conflicts after the World War II is Brune et al. (2012). They looked at a particular war with a prologue, the war in Iraq. The prologue is a period of tensions before the outburst of war (Brune et al., 2012, p. 3). The war in Iraq can be divided into two phases: the pre-phase with an increasing danger of the war to be interrupted by a peaceful settlement and the outbreak period where the war is already initiated. When creating the dataset, Brune et al. (2012) faced two major issues. First, they had a lot of difficulty determining which wars to include. Second, after selecting the wars to be included, they realized that the data was too small to be used for the amount of variables that they attempted to test econometrically (Brune et al., 2012, p. 10). While researchers such as Rigobon and Sack (2005) looked at the conflicts as a whole, the study by Brune et al. (2012) observed the conflicts as separate events. Therefore, they looked into the Vietnam War, the Gulf War and the war in Afghanistan individually to determine what effects they had on the U.S. financial market.

Researchers used news to determine the likelihood that an ongoing conflict will



result in war since the period of war "prologue" is different than an officially declared war. This data, which is similar to Rigobon and Sack (2005), also has measurement issues. They tried to correct for them, however, by using estimators for the probability that the war will occur in Iraq. When observing the effect of likelihood of war, the researchers studied only the war in Iraq because they had access to a number of independent estimates for the probability of a war. One of the estimators, "Saddameter" was already created and published by William Saletan on the website [www.slate.com](http://www.slate.com). Slate.com is an online web page about current affairs, politics, and culture magazine in the United States. The magazine is not a breaking news source, but rather a source of analysis and interpretation of the report in news media. The source is unreliable because of the credibility of this source could be questioned because it is known for entertaining and witty writing. The second estimator "Saddam Security" was obtained from the online exchange platform [www.tradesports.com](http://www.tradesports.com), which was created to track the dates that Saddam Hussein was still in power. Apart from the estimators, another news proxy was obtained from the *New York Times*, and it gave a daily amount of articles that contained the words "war" and "Iraq" (Brune et al., 2012, p. 7). In this study, researchers used two indexes from the U.S. financial market, the S&P500 and the Dow Jones Industrial Average, to measure the estimators' impact on financial markets. The news proxies seem to be more accurate and reliable than "Saddameter" and "Saddam Security" estimators. Brune et al. (2012) created and measured the news proxy variable in the study and thus, the reader can have a better understanding of its nature. On the other hand, it is hard to understand the process of creation and measurement by which two other estimators were obtained as they were pulled from the two external sources, websites. It is very likely that the internet sources of estimators, created for entertainment and betting, are biased. Thus,

by using estimators built on different websites, Brune et al. (2012) lowered the potential statistical significance of their research. These variables represent a significant limitation to the study since they impact the interpretation and findings of this study.

"The war puzzle" theory established by Brune et al. (2012) says that the relation between stock market prices and the probability of an international conflict is negative while war is still in the evolving phase. The relationship becomes positive once the war breaks out or the likelihood of war increases to 100% (Brune et al., 2012, p. 3). This means that the prices of stocks will decrease with an increase in the probability of war, and they will increase with the start of the war. This theory is significant at the 1% and 5% level if we look at the news variable and the "Saddameter" (Brune et al., 2012, p. 3). The findings also showed that if the war began as a surprise, the stock prices would decrease. These results indicate that the reason for the decrease or increase in stock prices does not depend on the particular war but rather on the history of it, meaning whether the war was a surprise to the society or not (Brune et al., 2012, p. 20). To understand the theory of the "war puzzle," researchers have looked at each war separately and performed a structural break analysis to determine whether the outburst of war had an effect on the stock market and identify the possible changes in trends of the stock market exchange. A structural break represents a change in the stock prices' mean, variance and trends over time (Hansen, 2001, p. 117). The structural change happens when one of these statistical parameters change at some point in time during the sample period. In econometrics, systematic methods are used to identify structural breaks.

First, the Vietnam War had no definite time frame in which it can be placed. Thus, the war was described to a great extent by different periods of tensions. The researchers discovered that the financial market experienced the largest shock on April

15, 1965, which marks the date the U.S. and South Vietnamese bombed the Viet Cong positions in the country. On this day, the Dow Jones Industrial Average index increased by 28.01 points and their results show the effect of war on this jump in stock prices is statistically significant at the 1% level (Brune et al., 2012, p. 13). One of the limitations while analyzing this war effect is that the researchers could not look at the pre-war period or the outbreak of the war, and thus it represents the deviation from the already established method of the "war puzzle" theory.

Second, the Gulf War began when Iraq invaded Kuwait on August 2, 1990, and ended on February 28, 1991, when the U.S. and its allies defeated Iraq (Brune et al., 2012, p. 14). Brune et al. (2012) results from the time-series tests showed that the news on the Gulf War had a negative relationship with the stock market prices. While supporting the "war puzzle" theory, the findings were statistically insignificant. The results could be limited by the fact that the war was observed from the perspective of U.S. and its allies (Brune et al., 2012, p. 14). The period of observation for the Gulf War was manipulated because it was shaped towards the researchers' perspective and the United States war involvement. As they were observing it from the U.S. perspective, Brune et al. (2012) used the date of the Operation Desert Storm, January 17, 1991, as a start date for their analysis. By using a date before the actual one, the researchers might have manipulated the findings to support the "war puzzle" theory. Instead of being looked at as a period of the war, the period of August 1990 to January 1991 was observed as a prewar period.

Finally, researchers also looked at the War in Afghanistan that began in October of 2001. This war had a short prelude that lasted only several months, starting on September 11, 2001. Even though the war was a surprise and the stock market prices

started to decrease as a consequence of the attacks, a structural break was noticed right before the outburst of war. The S&P 500 Index increased right around the war start (Brune et al., 2012, p. 17). The coefficient rose from 960 points on September 21, 2001, to 1100 on November 10, 2001. This increase in S&P 500 suggests that an unexpected shift has occurred in the time series data on stock prices. Structural breaks, if repeated, decrease the reliability of the model and increase the number of errors when forecasting. These structural breaks represent a limitation to the reliability of the "war puzzle" model and its ability to forecast without errors.

Even though Brune et al. (2012) concentrated on the wars that witnessed longer periods of tensions, they also looked into three examples of "surprise wars." They found that wars such as Pearl Harbor, the Korean War and the Persian Gulf War caused the stock market prices to drop significantly at the outbreak of the war (Brune et al., 2012, p. 19). This fall in market prices as a result of surprise wars is the complete opposite effect compared to wars with a prelude. The Dow Jones Industrial Average Index declined by 3% in one day when Pearl Harbor happened, 5% in the case of Korean War and 5.7% in the case of Gulf War in a week (Brune et al., 2012, p. 20). Because of these results, the "surprise wars" pose a challenge to the classical asset pricing models. The asset pricing model does not account for investors' expectations, and thus the outburst of war raises the systematic risk which cannot be diversified away. The asset pricing model reflects only the information that is available to the general public. Thus, the surprise wars are accounted in the model only after they occur.

As an attempt to explain this puzzling movement of the stock prices, Brune et al. (2012) established six explanations that provide some reasoning for this adverse effect. First, the researchers argue that the war is not a puzzle since it stimulates the economy.

While this explains the increase in stock market prices, it fails to account for the decrease in prices prior the war. Second, they pose an explanation that the time dimensions of the war, or the investors' expectations about a quick end of the war influence the flow of investment in the market. This explanation states the investors start buying stocks again after the outbreak of the war since they assume that the conflict would be over soon (Brune et al., 2012, p. 22). It does not explain why stock prices and the likelihood of war in negative relationship in the period before war. Investors' ambiguity aversion is also a possible explanation for the probability of war should lower the amount of investment. However, the ambiguity effect of the war probability stops once the war starts, and the uncertainty reduces (Brune et al., 2012, p. 23). Another explanation that Brune et al. (2012) proposed is the correlation between the uncertainty of the war and the uncertainty about choosing allocations for portfolios. A peaceful settlement and war would result in investors making different investment allocations (Brune et al., 2012, p. 23). Thus, in the period of high tensions, the optimal behavior would be if the investor would abstain from making an investment and reduce the amount of investment that they are placing in the stock market (Brune et al., 2012, p. 23). Brune et al. (2012) thus recommended that investors decrease their stock holdings substantially. Various assets would have a different pattern in different phases before the war starts (Brune et al., 2012, p. 26). For example, the stocks in the "peace portfolio" should be sold when the probability of war increases. The "peace portfolio consists of stocks in the industries that would react positively to a war peace agreement, such as the airline industry, tourism or travel industry. Positive reaction of an industry would mean an increase in the stock prices of the companies within these industries as a result of business increase.

The last explanation of the phenomenon is the classical mean-variance-

preferences. This method weighs the variance, which is volatility or risk, against the expected return on the market. It can help the investors decide how much risk they want to bear while making the investment. Brune et al. (2012) claimed that the paradox of war impact is correlated with the mean-variance preferences of the investors (Brune et al., 2012, p. 3). "One could argue that people do not buy when it is unsure what is going to happen due to their variance aversion, even though the expected return might still be a little bit better than when the war finally started" (Brune et al., 2012, p. 25). The mean-variance-preferences say that an absolute war is preferred over an uncertain situation with a high probability of a war (Brune et al., 2012, p. 21). Thus, we see an increase in the stock market price when war is absolute and a decrease in the stock price when the war could not have been predicted. The conclusion of the researchers is that the asset prices are extremely sensitive to the probability for the start of the war and that the mean-variance-preferences might be the best explanation of the puzzling effect of the wars in financial markets (Brune et al., 2012, p. 23). While mean-variance- preferences can explain part of the "war puzzle," there could be other explanations that are based on different behavioral factors. A new area of finance called behavioral finance, has been created to study the occurrence of anomalies in conventional finance and economics by adding behavioral and cognitive psychological theory to the traditional ideas. Anomalies in the financial market, such as war effect, violate the modern economic theories which assume that the investor will make their decisions based on rationale and logic. The conventional financial theory does not describe all situations that happen in the real world of financial markets. This does not mean that the standard theory has no value, but having behavioral finance in mind could explain how and why some occurrences in the financial markets happen. One of the factors that behavioral finance incorporates is "the behavior

of financial practitioners and the subsequent effect on markets” (Sewell, 2007, p. 1).

Factors such as psychological characteristics of investors and information structure might have an influence on the stock market.

In conclusion, Brune et al. (2012) saw a significant negative relationship between the likelihood of war and the movement of stock prices. War can be considered as a stimulus package for the U.S. economy and thus lead to an increase in stock market prices. Falling prices when war is looming and rising prices when war is starting: only the combination of these two observations makes the war puzzle a puzzle (Brune et al., 2012, p. 25). Using news analysis proxy for the estimated likelihood that a conflict will result in a war, they also discovered that "an increase in the war likelihood tends to decrease stock prices, but the significant outbreak of a war increased them” (Brune et al., 2012, p. 24). If the war starts as a surprise, the stock prices will experience a decrease. The researchers failed to explain this puzzling behavior of stock markets when the war starts by war risk, uncertainty aversion or by investors’ assumptions about a quick end of the war (Brune et al., 2012, p. 24). They argue that the most insight into this "war puzzle" can be provided by mean-variance analysis and behavioral finance.

To determine the impact of war on the financial market, researchers use time series analysis in order to detect the structural breaks in the financial market. While the "war puzzle" model by Brune et al. (2012) was limited by structural breaks, Choudhry (2010) tried to incorporate these structural breaks or "turning points," as he calls them, into his analysis of the war’s impact on the markets (p. 1022). Choudhry (2010) described structural breaks as lasting shocks that happen on irregular intervals. Choudhry (2010) argued that “while some large shocks permanently shift the trend function of a series, the majority of the shocks have only temporary effect” (p. 1022). Thus, events during the war

can have both permanent and temporary effect on stock market. Choudhry (2010) utilized a fundamental shift oriented test that detected endogenously structural breaks and analyzed their effect on the U.S. stock market during World War II. The study was based on the observations from the daily DJIA stock index from January 1939 to December 1945. The structural test identified specific events and periods that investors perceived as turning points. These turning points were different from the ones that historians identified because only selected political information is perceived as significant for financial markets. Thus, the structural shift test is used to measure and identify long-term structural changes in the structure of the economy, or specifically economic growth or economic development (Zeileis, 2005). Factors that cause such changes can be economic development factors, global shifts in labor and capital, changes in resource availability due to war, natural disaster, discovery or depletion of natural resources and changes in political system.

Choudhry (2010) investigated the potential breaks or turning points in the DJIA daily index based on three different sizes of periods analyzed: one month, two months and three months. This data has been reported in quarterly periods. For the next years observed, each time the entire period would be moved for one week since the first start/end dates. Using this data, Choudhry (2010) came to a conclusion that there are two types of breaks in stock prices. "Blips" are breaks that last only for a day or so, while "turning points" last much longer (Choudhry, 2010, p. 1037). While "blips" can be market reactions to false information, "turning points," usually make a much more significant impact on the stock exchange that is unlikely to change soon. Thus, consistent change in prices in the same direction could indicate a "turning point." The most significant difference between the "blips" and the "turning points" is that "blips" are



measured by the one day change in the prices while the "turning point" is measured as the sum of the changes in the price over the next five working days after the event. Thus, to capture this long run effect caused by battles and conflicts during WWII, the change in price over five working days was observed.

Choudhry (2010) showed that "turning points" were more significant to investors than "blips." He argues that investors view the majority of the events that were considered influential by historians "turning points" in financial markets. Various conflict developments (such as Pearl Harbor, the fall of Warsaw and the battle of Midway) are considered to be these "turning points." On the other hand, some events were only seen as "blips" such as the initial invasion of Poland by Germany (Choudhry, 2010, p. 1037). Because of long duration and high intensity, investors failed to identify some important dates as either "blips" or "turning points." Investor's inability to detect these may be due to several reasons. The investors might have expected some events. Secondly, the identification process could have been subjective since the investors did identify the turning points and not the general public. Finally, some of these events (such as Battle of Britain and Operation Market Garden) might not have been important enough to U.S. investors since U.S. military was not fighting against them.

Choudhry's (2010) argument is that events which change the probabilities of various outcomes, such as decisive battles, will be recorded in stock prices. After adjusting for serial correlation, he finds out that the U.S. financial market was heavily influenced by the events outside the U.S. during World War II. Choudhry (2010) argued that the war can affect the equity markets in two ways. First, war events can influence stock market by both increasing and decreasing equity prices. Good news from the battlefield usually implied the war would end soon, and thus the prices in the stock

exchange experienced a rise. Apart from this, Choudhry (2010) showed that any news that may indicate prolonging of the war resulted in a drop in the prices the day after the event and for the next five working days. Victories on the "Allies" side, the side that the U.S. was fighting on, influenced the stock market prices in a positive way in both one and five-day periods. Secondly, the investors can become more uncertain about the future profitability of equities and their risk (Choudhry, 2010, p. 1026). Lags in data from financial markets are an important issue here. There might be an issue with recognizing the lags, which represent the time between the period of actual economic shock and the period when the shock is recognized by investors. Days, weeks or months can pass studying data metrics, such as parameters of financial market performance, before the information gets collected and published to the public and investors. Thus, this information on war from the past should be used to predict future returns from stock markets. Apart from this, Choudhry (2010) looked at movement in the stock exchange before the U.S. officially joined or declared the war (p. 1031). The events that occurred before the U.S. involvement in the World War II were not perceived as important to the U.S. financial stock market by investors. These events are neither "turning points" nor "blips" to the stock market because the U.S. did not invest any resources or suffer any direct consequences. The last finding was that an escalation of the conflict did not lead to a rally in the stock market, unless the United States and Allies won or lost the battle (Choudhry, 2010, p. 1031). Because the victory is perceived as positive news by the investors, the stock market experiences a period of sustained increases in the equity prices. The length and magnitude of this rally would depend on the buying and selling behavior of investors after the information about victory is received. On the other hand, the investors viewed the defeat of the U.S. and Allies army as bad news which decreased

the stock prices. Another result is that financial markets had the biggest reactions to the events that started as a surprise and were economically relevant. The magnitude of the change in stock prices depends on the degree of the war surprise. The market reacts the most to surprise and economically relevant events because they have a great impact on investors' expectations about equity returns. Investors, who fail to use all the relevant information, even regarding the news from the battlefield, will face losses.

Some of the results were statistically insignificant because of two factors: long duration and high severity of some of these battles (Choudhry, 2010, p. 1030). There might be an issue of isolating the data and its impact that occurs over a long period of time. Thus, events such as battle of Kursk, battle of Coral Sea, battle of Normandy and battle of Guadalcanal were not identified as structural breaks or "turning points."

As political events, such as armed conflict or war, develop, market agents will adjust their position depending on the expected result of the conflict as this is determined by various incidents during the military operations that can affect the course and the outcome of the fighting. Schneider and Troeger (2006) looked at wartime events as exogenous developments that can become relevant for the financial markets. The researchers investigated the reactions of the DJIA, Financial Times Stock Exchange (FTSE) index and Cotation Assistée en Continu (CAC) index on the intensity of three conflicts in the period 1990-2000 (Schneider & Troeger, 2006, p. 623). In order to analyze the effect of war, they use a rational expectation framework within commercial liberalism. By using this framework, researchers were able to establish a rational expectations argument that explains the relation of political events to the world economy. This refined version of commercial liberalism allowed the researchers to test for the degree to which the three indices reflected international news during a ten year period

(Schneider & Troeger, 2006, p. 624). By using this method, researchers show that conflicts have an adverse effect on the interactions inside the three financial markets, French, U.S. and British. "This article introduced a refined version of commercial liberalism to show that international markets react negatively rather than positively to war but that "war rallies" at stock markets can also be occasionally observed" (Schneider & Troeger, 2006, p. 642). Similar to Brune et al. (2012), Schneider and Troeger (2006) discovered the puzzling impact of war. They have found that even though events during wartime should lead to adverse reactions, an escalation of the conflict may still lead to a rally in the stock market.

Hostilities usually lead to a reduction of uncertainty and an increase in the price of stocks in the market. The researchers define hostilities as the severity of the conflictive events during war. They found that as war in Iraq developed, the Dow Jones Industrial Average index was rising as investors perceived the intensification of a conflict as a sign of Western resolve. On the other hand, conflicts in Israel/Palestine and Ex-Yugoslavia had a negative impact on the US stock market. "While it is reasonable to anticipate negative effects of the average conflictive act, markets might respond positively to certain violent episodes within a war because they signal that the worst is over or that the damage might not be as great as originally expected" (Schneider & Troeger, 2006, p. 624). In order to demonstrate this positive reaction of stock markets to fierce battles during war, Schneider and Troeger (2006) gave an example of the conflict between the alliance led by U.S. and the Iraqi regime of Saddam Hussein. While the Dow Jones Index decreased by 6.31 percent following the intrusion of Kuwait by Iraqi military troops in 1990, it increased 17 percent in the initial four weeks of operation called "Desert Storm" (Schneider & Troeger, 2006, p. 625). This contradictory reaction of the markets can be

attributed to the escalation period of the armed conflict. This "war rally" in the U.S. stock market was interrupted by an increase in volatility of the index because the U.S. military encountered resistance.

A common method used by researchers is to collect cross country data, where war or conflict is expressed with a dummy variable and evaluate the effect of it over time on other variables such as investment rates or economic growth. This method is criticized because it is difficult to identify a causative relationship between the existence of conflict and the variable of interest. Guidolin and La Ferrara (2005) addressed the problem in an easier way with the purpose to isolate the analysis of the war impact on the financial markets. In order to do so, they look at the problem endogenously by observing the relationship of violent conflict and asset market reactions that are led by investor's perceptions. They use the event study methodology to observe not only the stock market, but also market with currencies, futures contracts and standardized commodities (Guidolin and La Ferrara, 2005, p. 2). They also considered a sectoral stock market index which might be of extreme interest for the future, a defense equity index for the US. They obtained weekly data on the Dow Jones' Aerospace & Defense MicroSector Index, which is a continuously rebalanced fund containing five blue chip stocks registered on the New York Stock Exchange. Companies that were included at the moment of their research were: Boeing, General Dynamics, Lockheed, Northrop, and Raytheon (Guidolin and La Ferrara, 2005, p. 10).

Guidolin and La Ferrara (2005) observed the effect that 112 conflicts and civil wars had on national stock, foreign and world market indices in the period from 1974 to 2004. They distinguished between the civil wars and international conflicts, as well as international and domestic markets. Findings showed that most of the conflicts observed

impacted the stock indices and stock commodity prices significantly. "When we disaggregate between internal and international conflicts the US index is the one that yields on average the highest proportion of significant results: 7.5% of internal conflicts have a negative impact, and 10.4% have a positive one, while for international conflicts there figures are 8.3% and 16.7%, respectively" (Guidolin and La Ferrara, 2005, p. 15). The U.S. market also reacts more positively to the start of war than negatively. Apart from this, the national stock market is more likely to display positive reactions to war news compared to other world markets. When comparing the results on U.S., UK and French stock markets, researchers found that international conflicts affect U.S. markets more often than UK and French ones. A reason for this can be that the speculative activity is greater in most efficient financial centers such as The New York Stock Exchange (NYSE) and National Association of Securities Dealers Automated Quotations (NASDAQ). In these centers the risk of loss is more than offset by the possibility of huge gain. Apart from this, the finding that U.S. markets appear to be more reactive suggests that domestic markets experience war-induced rallies in which investors tend to buy and the beginning of conflict is seen as an indication of resolve. Location of the war matters as well. The impact of international conflicts is more significant than domestic, regardless of whether the impact was positive or negative.

Polarization is another factor that affects the stock market. Political polarization refers to the situations where individual's view on different issues, policies or people is likely to be shaped by their identification with a particular political party or ideology. Researchers refer to a country as "highly polarized" if the Montalvo and Reynal-Querol (2005) ethnic polarization index is more than or equal to the sample median polarization level. Countries that have "low polarization" have a polarization index that is smaller

than the sample median (Guidolin and La Ferrara, 2005, p. 18). “If we consider that highly polarized societies are societies where the opponent groups is relatively more balanced (with the highest polarization occurring when society is split into two equally sized groups), then we obtain the prediction that conflict should last longer in more polarized settings (Guidolin and La Ferrara, 2005, p. 7). The study done by Montalvo and Reynal-Querol (2005) shows that the median duration of civil war doubles as the ethnic polarization index raises from zero to one (Guidolin and La Ferrara, 2005, p. 7). These findings show that polarization influences investors' expectations about the duration and intensity of the war. Thus investors tend to react more in the polarized settings. In “highly polarized” countries, polarization would amplify the impact of war in the stock market. This indicates that the social structure of the countries and regions where the conflicts occur is important to markets and investors when creating expectations on the intensity and duration of the war (Guidolin and La Ferrara, 2005, p. 3). "Eighteen percent of the international conflicts taking place in highly polarized countries have a negative effect on the World stock market index that we consider, while none of those taking place in countries with low polarization do" (Guidolin and La Ferrara, 2005, p. 3). The study done by Guidolin and La Ferrara shows that expectations about length and intensity of war further affect the stock markets. These findings should be taken with reserve since Guidolin and La Ferrara (2005) argued that polarization can enlarge the results. Polarization of the country magnifies the magnitude of the war's impact on the economy inside the state (Guidolin and La Ferrara, 2005, p. 18). Researchers argue that polarization in society and politics go together with polarization in economics. Polarization of the economy indicates that there is great gap between low-class and high-class jobs in terms of wages and abilities of the workers. Differences in wages and skills

influence the social structure of the region. Social structure of the region and political information manipulates investor's expectations on the intensity and duration of wars in the case where investors learn from biased or inaccurate political information. Thus, the magnification is more severe at the beginning of the conflict as political information on polarization and social structure can be enlarged and distorted. This might be a reason why findings on wars in polarized countries are more significant than results in less polarized regions.

To sum up, as the war develops and moves from one stage to another, the impact of war on stock market changes as well. In the evolving phase, war has a negative impact on equity prices. Wars that began as a surprise had a negative impact on prices as well, while expected wars, or wars with prelude, increased stock prices. During the war, conflicts perceived as "turning points" had much larger impact on stock markets by causing both surge in prices and drop in prices depending on whether the United States was winning or losing. "Blips," or one-day shocks had less severe impact on the stock market. Escalation in conflict may lead to rally in the U.S. equity market. The domestic stock market experiences more positive reactions to ongoing international conflicts than negative ones. Polarization and duration of war impact the magnitude and the direction of impact (positive or negative).

### **Post-war effect**

Overall the post-war period appeared to exhibit less price fluctuation (Gordon, 1986, p. 659). Thus, the post-war era is stronger and more stable than the prewar period. Feldstein et al argue that "the economy's downturns have been both shorter and shallower" (Feldstein et al., 1980, p. 12). The economic recessions are less frequent in this period and the recessions that follow war are usually less severe than the recessions



before or during the war. This can be seen from the example that no severe recessions happened for decades after 1953-1954 and 1957-1958 recessions. In the period after the war, equity prices are less variable (Feldstein et al., 1980, p. 13). All of these indicate that the country enters a period of economic stability and prosperity.

Once the public and investors realize that the post-war period started, they change their thinking that was originally present during the war. They observe government's implementation of important economic policies after the end of the war. Postwar policies that focus on economic growth and stability have the biggest influence on financial markets. These procedures may include shifts in favor of federal versus state administrative powers, more bank consolidations and more branch banking. "Change may be orderly or disorderly, but change must come" (Chandler, 1967, p. 12). The hope is that future policies will place less emphasis on restrictiveness and more on the promotion of competition in financial markets (Chandler, 1967, p. 12).

In order to compare the effect of war in the postwar period, it is necessary to study what financial markets say about consequences of war. Leigh, Wolfers and Zitzewitz (2003) argued that financial markets have reported new information, assessed risks and aggregated public and expert opinion better than economic activity. Unlike the analysis methods used in the prewar and during the war periods, Leigh et al. (2003) used a different method of analysis called the prospective approach. "The prospective analysis system allows analysts to create models representing future situations of concern, drive and sustain them with evidence contained in current data and make reasoned estimates about the future" (Turner, Hetzler, Cheney, Williams, & Zabriskie, 2003, p. 1). The reason why Leigh et al. (2003) used this method of analysis is because they argue that financial markets do not only evaluate the present cost of war, but also take into

consideration the number and intensity of future conflicts (Leigh et al., 2003, p. 2). The scholars used “a financial instrument called "Saddam Security," which is an asset whose payoffs were correlated with the ousting of Saddam Hussein” (Leigh et al., 2003, p. 1). The future effect of war on oil prices was measured by this study by comparing movements in the paper has "Saddam Security" instrument to the volatility in the price of oil futures (Leigh et al., 2003, p. 1). Their results showed that the U.S. financial markets are very sensitive to the probability of war. The ten percent rise in the probability of expelling Saddam from the leadership position decreased the S&P 500 by 1.5 percent (Leigh et al., 2003, p. 1). This indicates that the U.S. equity prices decreases by 15% in case of war. “The increase in (non-diversifiable) risk associated with war should also increase the cost of equity; equity valuations are of course sensitive to even small changes in the cost of equity” (Leigh et al., 2003, p. 18).

Leigh et al. (2003) investigated and analyzed three issues in their paper. First they use financial market data to better understand the consequences of a U.S. policy decision in real time, such as the invasion of Iraq. Second, their paper questions the extent to which stock market movements can be explained by the news. Unlike Cutler, Poterba and Summers (1989), who argue that the media reports can explain only a small part of the market movement, this paper claims that econometrically, changes in probability of war can justify 30 percent of the variation in the S&P 500 and 75 percent fluctuation in spot prices of oil over the last five months (Leigh et al., 2003, p. 2). And lastly, their paper highlights the expected value to investors of political securities in improving the efficiency of markets. Political securities explain uncertainty about war and its impact on aggregating information about the likelihood of war in a publicly observed market price. The political uncertainty contributes to the uncertainty about asset values, and thus the

study suggests that investors should revise their beliefs about the utility of political risk securities (Leigh et al., 2003, p. 2). This suggests that the other non-war components can explain uncertainty in the stock prices.

The biggest financial consequences of the Iraq war on the United States were the increase in the direct military expenditure, the cost of rebuilding Iraq in the post-war period, and macroeconomic repercussions caused by changes in oil prices (Leigh et al., 2003, p. 3). The direct cost of going to war with Iraq for the U.S. has been estimated to be somewhere from \$22- \$140 billion. The U.S. would also have additional cost through peacekeeping, reconstruction and humanitarian assistance over the decade 2003-2012 at somewhere between \$106-615 billion (Leigh et al., 2003, p. 5). This indicates the postwar rise of private debt economy. This increases the liabilities held in the market.

To find more about the cost of war Leigh et al. (2003) investigated its effect on oil markets and company values. War had the largest negative effects on the sectors of consumer discretionary and business equipment (Leigh et al., 2003, p. 36). On the other hand, "oil futures suggest that any adverse effect of war on oil prices will be short-term and that the NPV (net present value) of the long-run terms of trade shock is zero or slightly beneficial for a net oil importer, like the U.S." (Leigh et al., 2003, p. 35). Leigh et al., (2003) argued that in the short-run the oil prices per barrel would rise \$1 for every ten percent increase in the likelihood of war with Iraq. Thus, if the risk of war rose to 100 percent, meaning if the war started, the prices of oil would increase by \$10 per barrel. In the long run oil prices may fall.

Leigh et al. (2003) analysis is incomplete since it does not take into consideration the effect that the military intervention might have on the population and economy of Iraq. Because consequences inside Iraq would have direct effect on oil prices, the Dow

Jones Industrial Index would also be influenced by these internal developments in Iraq. Export oriented infrastructure and strategies in Iraq will also affect the economy of United States, and thus diplomacy and training of Iraqi oil industry leaders would help the domestic economy. Apart from this, substantial volatility in the market might be due to other factors than the likelihood of war. The prices may also move according to the new foreign policy that President Bush was making effective for future conflicts. Bush declared war on every political community or individual that supported terrorist groups. The new foreign policy, also referred to as the “Bush Doctrine,” advocated for an increase in unilateral military actions by the United States, increase in attacks on countries that harbor terrorists, use of pre-emptive wars in anticipation of imminent offense or invasion and implementation of democratic regime in government systems around the world as a strategy against terrorism.

To conclude, economic recessions, post war policies and cost of war influences financial markets in the post-war period. War had negative effects on specific sectors in the market (consumer discretionary and business equipment) as well as oil prices. Political securities could be used to predict the uncertainty of equity prices after war ends.

The literature concludes that in the pre-war period, information from history and news seems to control the direction and magnitude of the war’s effect on stock prices. The anticipation of a future war depresses stock prices. An increase in the probability of war will decrease stock prices while the outburst of war will impact the returns positively (Brune et al., 2012, p. 3). The only instance where the increase in war risk has a positive effect on stock markets is during major wars such as World War I and World War II (Ferguson, 2008, p. 468). There is no general conclusion about the effects of wars of

different scales and nature. Instead, specific war characteristics such as regulatory regimes or developments in military and technology should be accounted for when extracting lessons from history (Ferguson, 2008, p. 436). Apart from this, war with prologue has a positive impact on stock prices while surprise wars and terrorist attacks magnify a decrease in financial returns (Brune et al., 2012, p. 3).

During a war, “turning points,” or war events relevant to investors, had a much larger impact on stock markets by causing an escalation of prices when the United States was winning the conflict. On the other side, when the United States was losing an important battle, stock market prices decreased (Chourdy, 2011). “Blips,” or one-day war shocks, had less of a severe impact on the stock exchange. Apart from these adverse effects, intensification of conflict may lead to a rally in the U.S. equity market (Schneider & Troeger, 2006, p. 642). The destination and social structure of countries where the U.S. is fighting war matters (Guidolin & La Ferrara, 2005). When it comes to international conflicts, the U.S. stock market has more positive reactions than negative ones. Polarization and the duration of war impact the magnitude and the direction of effect (positive or negative) on domestic financial market performance (Guidolin & La Ferrara, 2005).

After the war has ended, the financial stock market experiences major fluctuations in stock market returns. The reasons for this may be economic recessions, postwar policies and the costs of war influences financial markets in the post-war period (Chandler, 1967). War had negative effects on specific sectors in the market (consumer discretionary and business equipment) as well as oil prices. Political securities could be used to predict the uncertainty of equity prices after the war ends (Leigh et al., 2003, p. 2).

## **Chapter 4: Testing the Hypothesis**

There is a divide in literature as to whether war and movements in Dow Jones Industrial Average index are negatively or positively related, with the reasons stemming from differing empirical approaches, different datasets over different periods, and the use of various explanatory variables. This chapter seeks to add value to the literature by using updated data collected in 2015. Additionally, different variables are used to attempt to improve past models and include relevant variables that describe the movement in the stock market.

The hypothesis that the U.S. involvement in a war, whether it is congressionally authorized or a unilateral act by the president, will cause a positive change in returns from Dow Jones Industrial Average index will be tested econometrically using regression analysis. Independent variables gathered are financial indicators and parameters that affect the condition of stock markets, found in studies such as Mehl (2013), Koubi (2005) and Schneider and Troeger (2006). Several new explanatory variables, which were omitted from the literature, are included, and their importance is highlighted. The dependent variable observed is the percent change in returns from the Dow Jones Industrial Average Index. In this paper, the findings show that short wars have a highly positive impact on the quarterly returns from financial markets. The results indicate that a decrease or increase in index prices does not depend on the particular war but rather on the history prior it, meaning whether the war was a surprise to the investors or not. The rest of the chapter is set up in the following manner; the first section includes a description of the data and their effect on the stock market and Section II describes the econometric model employed in this study. Section III shows empirical results and comments on the statistical and

economic significance of the estimators. The last section of the chapter is the discussion and conclusion.

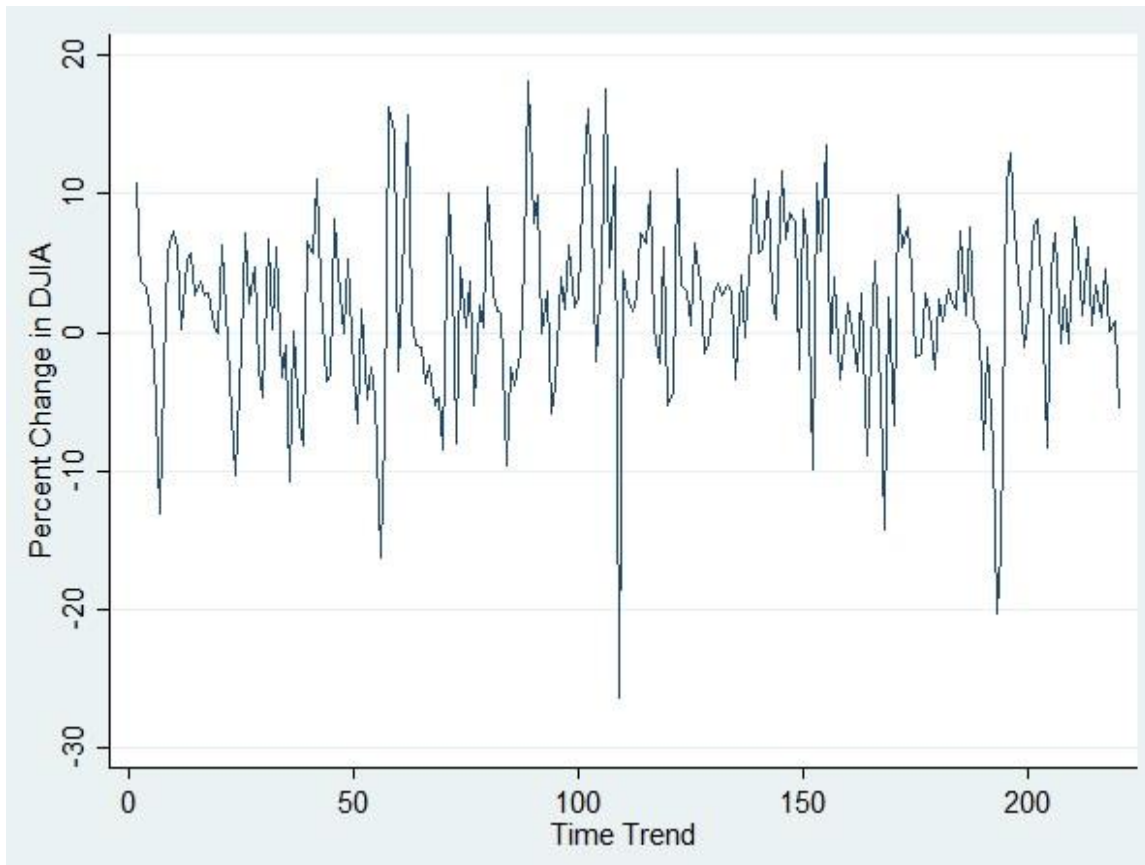
### **Data**

The dataset was collected from 220 quarters on the movement in the Dow Jones Industrial Average index price, starting from October 1949. Three subsequent months in a year represent quarters that end in March, June, September, and December. The variables that were chosen were based on previous research done by as Mehl (2013), Koubi (2005), Brune et al. (2012) and intuition. Initially collected data was reduced several times to obtain the final version used for the purpose of this study and analysis. The money supply variable was removed because of the high multicollinearity with the Exchange Rate and Federal Debt. Because many observations were omitted before 1960 eleven years of observation had to be dropped from the initial dataset.

The data gathering was concentrated in the years after October 1960. The result is a dataset of 220 quarterly movements on the Dow Jones Industrial Average index price during different wars. As discussed in the previous section, wars led by the United States can be divided into two categories based on war powers: unilateral acts by a President and congressionally authorized wars. Time periods for these wars is listed in Table 1, Table 2 and Table 3. There are eighteen periods of war and conflicts that were observed and each of them varied in nature, duration and scale.

Limitations are placed on the extent of the analysis due to the relatively restricted period and the amount of information on recent wars. Figure 8, depicts the movement, and behavior of the Dow Jones Industrial Average index returns over time and different wars. The time trend observed is from 1960 until 2015, where 1 stands for the first quarter in 1960 and 220 for the third quarter in 2015.

**Figure 8. Historical Dow Jones Industrial Average returns (% $\Delta$ ) 1960-2015**



Source: *Data used in this study.*

It is important to note that the variable of interest is the quarterly percent change in the Dow Jones Industrial Average stock price index. The quarterly return from DJIA stock price index represents a measurement of the war's impact on the return from U.S. stock market. The DJIA index return was expressed in quarterly percent change to avoid issues of heteroscedasticity that is common in time series data. Apart from this, DJIA stock market index has been selected over others, such as Standard & Poor's 500 (S&P 500), because of its long existence, and reputation of the most-cited market indicator in different academic and educational sources (such as publications, newspapers, the internet). "The DJIA today serves the purpose to provide a clear, straightforward view of the stock market and by extension, the U.S. economy" (McGraw Hill Financial- Dow



Jones Averages, 2015). The Dow Jones Industrial Index is often called Dow 30 since it contains 30 different component companies that are coming from manufacturers that produce industrial and consumer goods (McGraw Hill Financial - Dow Jones Averages, 2015). Other businesses included are from various sectors such as financial services, information and communications technology and entertainment. Table 2 lists the different enterprises that were components of Dow Jones Industrial Average at the time when the data was collected. The table also lists companies that were components of DJIA index in June 1959. Since Charles Dow created the DJIA index in 1896, there were nearly 50 changes to its elements because the index followed the variations in the economy itself. While DJIA index consisted of 30 components back in 1960, they were significantly different from the companies in the index today.

Because the Dow Jones Industrial Average index contains stocks that are frequently traded and widely held by institutional and individual investors, the fundamental characteristic of this market indicator is timeliness. Timeliness makes the trading price of the Dow Jones reflect the most recent transactions conducted at any time during the day when the stock market exchange is open. It also accounts for all the necessary changes in the stock prices of element companies. The data on the adjusted close price of the Dow Jones Industrial Average index was collected from its source, S&P Dow Jones Indices database, which is in large part owned by McGraw Hill Financial.

**Table 2: Components of Dow Jones Industrial Average Index (September 2015 and June 1959)**

September 2015		June 1959
Ticker	Company Name	
MMM	3M Co.	Allied Chemical
AXP	American Express Co.	Aluminum Company of America
AAPL	Apple Inc.	American Can
BA	Boeing Co.	American Tel. & Tel.
CAT	Caterpillar Inc.	American Tobacco B
CVX	Chevron	Anaconda Copper
CSCO	Cisco Systems Inc.	Bethlehem Steel
KO	Coca-Cola Co.	Chrysler
DD	E.I. DuPont de Nemours & Co.	Du Pont
XOM	Exxon Mobil	Eastman Kodak Co.
GE	General Electric Co.	General Electric Co.
GS	Goldman Sachs Group Inc	General Foods
HD	Home Depot Inc.	General Motors Co.
INTC	Intel Corp.	Goodyear
IBM	International Business Machines Corp.	International Harvester
JPM	JPMorgan Chase	International Nickel
JNJ	Johnson & Johnson	International Paper Co.
MCD	McDonald's Corp.	Johns-Manville
MRK	Merck & Co. Inc.	Owens-Illinois Glass
MSFT	Microsoft Corp.	Procter & Gamble Co.
NKE	NIKE Inc	Sears Roebuck & Co.
PFE	Pfizer Inc.	Standard Oil of California
PG	Procter & Gamble Co.	Standard Oil (N.J.)
TRV	Travelers Cos.	Swift & Co.
UTX	United Technologies Corp.	Texaco Incorporated
UNH	UnitedHealth Group Inc.	Union Carbide
VZ	Verizon Communications	United Aircraft
V	Visa Inc	U.S. Steel
WMT	Wal-Mart Stores Inc.	Westinghouse Electric
DIS	Walt Disney Co.	Woolworth

*Source: McGraw Hill Financial- Dow Jones Averages, 2015*  
*Statement as of 12/10/2015*

The main independent variable used to represent war contains wars that are congressionally authorized and uses of force by the President. Because there was no document officially published by the government that gives a complete overview of wars

which were led by the United States or wars in which the United States was involved in, Fishers (2004) book *Presidential War Powers* was used as a source of the war data. As it can be seen from Table 3, the start and end dates of these wars were used to create this predictor variable over the period observed. U.S. involvement in the war is represented by a dummy variable. Even though the exact start and end dates are not reflected accurately in the quarterly data, a value of one was given to the quarter that was, at least, one day into the war in which the U.S. was involved. Zero signifies any quarter where there was no war, or any quarter when the U.S. was in peace with other countries. Between 1960 and 2015, there were only five congressionally authorized wars. Thirteen other conflicts were a result of uses of force by the President.

<b>Table 3: United States Involvement in War (1960-2015)</b>		
<b>War</b>	<b>War Start Date</b>	<b>War End Date</b>
Vietnam War/ Gulf of Tonkin	August 7, 1964	April 30, 1975
Mayaguez Affair	May 12, 1975	May 15, 1975
Operation Eagle Claw/ Iran	April 24, 1980	April 25, 1980
Conflict in Lebanon/ Beirut*	September 29, 1982	February 26, 1984
Conflict in Grenada	October 25, 1983	December 15, 1983
Conflict in Libya	March 24, 1986	April 18, 1986
Persian Gulf Escorts/ Operation Earnest Will	May 17, 1987	September 26, 1988
Panama/ Operation Just Cause	December 20, 1989	January 31, 1990
Persian Gulf War I/ Operation Desert Shield/Operation Desert Storm	August 2, 1990	February 28, 1991
Missile Attacks on Baghdad	June 26, 1993	June 26, 1993
Combat Operations in Somalia/ Operation Gothic Serpent	August 8 1993	March 24, 1994
Haiti/Operation Uphold Democracy	September 19, 1994	March 31, 1995
Bosnia and Herzegovina/Operation Deliberate Force	August 30, 1995	September 20, 1995
Iraq missile attacks/ Operation Desert Fox	December 16, 1998	December 19, 1998
Sudan and Afghanistan missile attacks/Operation Infinite Reach	August 20, 1998	August 20, 1998
Conflicts in Yugoslavia/ Serbia	March 24, 1999	June 11, 1999
Afghanistan/Operation Enduring Freedom	October 7, 2001	Present
Persian Gulf War II/Iraq/Operation Enduring Freedom	March 20, 2003	May 1, 2003
<b>Source: Fisher, Louis (2004). <i>Presidential War Powers</i>. Lawrence, Kansas: University of Kansas Press.</b>		

Table 4 shows descriptive statistics for all the variables used in the regression analysis. Model I observed the impact of ten different variables on Dow Jones Industrial Average index, such as Consumer Confidence Index, beginning of war, war duration, exchange rate (GBP/USD), interest rate, unemployment rate, inflation rate, real debt, real GDP and real federal deficit.

To analyze the impact of U.S. war on the stock market returns in Model I, two additional war variables were created from a variable on periods of United States involvement in the war. War duration indicates the length, or the number of quarters, of

each war that U.S. was involved in. It investigates whether the duration of war has any impact on financial markets. One stands for the first quarter of war, two for the second quarter and so on. Previous research suggests that war duration has a positive impact on economic growth (Koubi, 2005). Duration, however, is expected to have adverse effects on the stock market. To account for the timing of the war and analyze whether the start of the war had an effect on the stock market returns, a measure for the beginning of the war was employed in the first model. Brune et al. (2012), suggest that the start of war will impact the stock prices positively because the investor the uncertainty about the future events is decreased. One indicates the first quarter of each war and zero stands for all other quarters.

The percentage change in Consumer Confidence Index (CCI) is used as the indicator that measures consumer confidence. Consumer confidence represents the level of optimism about the state of the economy which is enunciated by consumers' activities in savings and spending Collins and Shinko, 2009, p. 1). Each month 5,000 households are examined about their opinion on five different topics: current conditions in business, commercial enterprise circumstances in the following six months, current employment situation, the status of employment in the coming six months and cumulative family income for the subsequent six months (Collins and Shinko, 2009). In the U.S., the Conference Board, which is an independent organization for research in economics, conducts all of this research and issues the index. The benchmark for this confidence is the year 1985 where the index has a value of 100. The CCI index is important because investors use it in the process of determining periodic trends commodities, currencies and equities. Because it measures optimism about the state of the economy, higher CCI index indicates that the economy is in a stable condition. Thus, the predicted relationship

between CCI index and the stock market is positive. Monthly Consumer Confidence Index data was collected from the Organization for the Economic Co-operation and Development (OECD) database.

Data used for Model I contains four different economic indicators that are expressed in rates: exchange rate, interest rate, unemployment rate and inflation rate. The exchange rate used in this study is the British Pound to the U.S. Dollar (GBP/USD). This currency pair indicates how many U.S. dollars need to be exchanged for one British Pound. This currency pair was selected because it is one of the major, or most traded, currency pairs. Apart from this, GBP/USD exchange rate had the most historical data available. Because the U.S. dollar convertibility into gold was suspended in August 1971, the number of observations for this variable was significantly smaller if compared to other explanatory variables in the dataset. The exchange rate was included in the dataset because it affects the returns investors receive from the stocks of foreign companies or portfolios with foreign holdings. Investors often make attempts to hedge the risk arising from exchange rate movements. Data on exchange rates was obtained from the Federal Reserve database.

Another economic indicator used included in this dataset is the prime loan interest rate. This prime lending rate is an interest rate used by banks and it represents the cost of borrowing money to the best customers. The data obtained from the Federal Reserve database included monthly "average majority prime rate charged by banks on short-term loans to business, quoted on an investment basis" (Federal Reserve, 2015). This interest rate is essential to stock market returns because it affects the discretionary income of consumers and consequently the performance of businesses as indicated by profits and revenues. In a more direct way, this interest rate represents the cost of borrowing and

affects the amount of dollars businesses can borrow from banks too. This will affect the stock valuation process, as higher prime loan interest rates would usually mean lower expected future cash flows of the company. Both of these interest rate effects will impact the valuation of a company's stock, as well as size and direction of the investment. Even the prime loan interest rate does not have a direct influence on the stock market, increases in interest rates should decrease the amount of investment in the stock exchange. When interest rates increase domestic investors prefer to invest in bonds rather than investing in equities because for they get less risk for the same money. The Federal Funds rate has a more significant effect on the stock market because it affects the stock valuation process in a more direct way than the prime loan rate. Because of high collinearity with another explanatory variable, the inflation rate, the bank prime loan rate was chosen instead of the Federal Funds Rate.

The third economic indicator used in the first model is the level of unemployment. The civilian unemployment rate is defined as "the number of unemployed persons as a percentage of the total labor force" (Bureau of Labor Statistics, 2015). More people with jobs equate to higher income, potentially higher retail sales, savings, and corporate profits. Thus, stock prices rise or fall with low or high unemployment rate. The state of the economy is important to investors when making investment decisions. However, since most people do not know what a "good economy" means, people usually associate low levels of unemployment rate with a "good economy." In contrast, a high unemployment rate is a signal of an "unhealthy economy" (Talubee, n.d.). Thus, the predicted impact of increasing unemployment levels is negative. The data on monthly unemployment rate was obtained from the Bureau of Labor Statistics database.

Finally, the inflation rate was another controlled variable used in this dataset. To

calculate the price movement of goods and services from 1960 until 2015 the Consumer Price Index for all Urban Consumers (CPI-U) was used as it is one of the most reported indexes. The inflation rate can also cause the stock market to rise or fall depend on the signals this indicator provides, investor's ability to hedge and government's implementation of monetary policy. The stock market experiences greater volatility during periods of high inflation levels. Nominal stock prices were expected to increase during the times of high inflation as investors used this as a hedge against inflation (Pearce, 1984). Thus, a positive effect on stock market returns is expected during periods of increasing inflation. Data on CPI-U was collected from the Bureau of Labor Statistics.

Real debt, as a change in direct liabilities of the United States Government over time, is a significant factor in the U.S. financial market. Change in real debt refers to the change in the U.S. national public debt which consists of all government debt securities issued by the U.S. Treasury. As government spending and borrowing increase, investors become more concerned about the state of the economy (Hrung & Seligman, 2011). Thus, the greater real debt would decrease the stock prices. However, the effect of real debt on stock market returns is inconclusive. Data on federal debt was collected from the Federal Reserve database.

The federal deficit is the amount by which the government's total budget outlays exceed its total receipts for a fiscal year. While the current deficit is factored in stock market prices, information and news on the deficit amount that is different from what is already known and expected will impact investment returns. Roley and Schal (1998) suggest that increase in the deficit impact the stock market by slightly increasing the stock market. Since deficits rise during recessions, the positive effect of a federal deficit on stock prices is caused by an increase in output from recession levels (Roley & Schal,



1998). On the other side, the “deficit hawk” argument states that government deficits cause higher inflation and higher interest rates (Northrup, 2003). The impact of a deficit on the stock market would then be inconclusive. Thus, the literature is divided on whether the federal deficit is a good indicator of stock market performance.

Real Gross Domestic Product (GDP) is another indicator of an economy's wellbeing. Real GDP is adjusted for inflation, and it represents the total value of all final goods and services produced in a specific year within the country's borders. It includes consumption by individuals and public, as well as outlays, net exports and investment by a government (Gans, King, Stonecash, & Mankiw, 2011, p. 448). Any significant change in real GDP should have a substantial effect on stock market returns. Since GDP is a measure of the country's economic performance, a rise in the level of GDP would suggest better performance of companies. As a result, companies would increase their investment activity which would affect their earnings and stock valuation positively (Talubee, n. d.). Thus, higher real GDP levels will increase the expected returns from the stock market. Annual data on real debt, real GDP, and the real deficit were obtained from the *Economic Report of the President*, 2015.

Apart from the exchange rate which has 179 observations, most of the variables that were used in the first model have 220 observations. There are some variables, such as Consumer Confidence Index and Real GDP that have a small amount of data missing. One or two observations of these variables were omitted because of the process of calculating percent change from the original dataset.

Table 4 shows that the variation in the return on investment ranges from about roughly negative 26.4 percentage to about positive 18 percentage on a quarterly basis. The average change in gain from DJIA index is estimated to be about 1.7% for every

quarter. Since 1960, the United States was involved in war 60 % of the time. The longest war lasted 57 quarters. This corresponds to the period of United States war involvement in Iraq and Afghanistan. The British Pound to U.S. Dollar exchange rate indicates that one pound was worth \$1.7 on average. This amount implies that U.S. exports to Great Britain were supposed to be greater than imports. Apart from this, exchange rate movements could have a significant impact on returns from foreign company stocks. The unemployment level was six percent on average during every quarter since 1960. This percentage indicates that from 1960 until 2015 unemployment rate was slightly higher than the natural rate of unemployment, which is five percent on average. The level of interest rates was seven percentage on average for every quarter since 1960. The lowest historical interest rate was about three percentage and highest about eleven percent for every quarter. Real debt increased by about one percent on average every quarter since 1960. This quarterly increase means that debt rose during a sustained period of time. Unlike federal debt, the deficit experienced a greater movement over time. The percent change in the deficit on a quarterly basis ranged from about negative 743 percentage to about positive 2519 percentage. The percentage change in deficit is great because it reflects major peaks and declines in quarterly federal deficit since 1960. On average, the quarterly percent change in federal deficit indicates that government spending exceeded business and individual spending by 12 percentage.

<b>Table 4: Descriptive statistics of overall sample</b>				
<b>Variable</b>	<b>Mean</b>	<b>Standard Deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Dow Jones Industrial Average index (Percent Change)	1.7480	6.4733	-26.3735	18.0872
Year	1987.75	15.9166	1960	2015
Month	7.5000	3.3618	3	12
U.S. Involvement in War	0.6000	0.4910	0	1
Consumer Confidence Index (Percent Change)	0.0014	0.4868	-1.4844	1.6626
Unilateral Acts by the President	0.0864	0.2815	0	1
Congressionally Authorized Wars	0.5136	0.5009	0	1
Beginning of War	0.0591	0.2363	0	1
War Duration	11.6727	15.9746	0	57
Short War (less than six months)	0.1045	0.3067	0	1
Medium War (between seven months and two year of conflict)	0.1273	0.3340	0	1
Long War (more than 2 years of conflict)	0.3682	0.4834	0	1
Exchange Rate (GBP/USD)	1.7617	0.3072	1.1152	2.5974
Interest Rate	7.3980	3.3194	3.25	20.3233
Unemployment Rate	6.1076	1.5945	3.4	10.6667
Inflation Rate	0.9572	0.8265	-2.8272	3.9508
Real Debt (Percent Change)	0.9587	1.3388	-2.0244	5.6480
Real GDP (Percent Change)	0.6595	0.9506	-3.4265	3.3710
Real Deficit (Percent Change)	12.0051	184.8419	-742.7901	2519.312
<i>Sources: The Federal Reserve, 2015; OECD, 2015; Bureau of Labor Economics, 2015; Economics Report of the President, 2015; Congressional Research Service, 2015; The World Bank, 2015; Fisher, 2004.</i>				

The second model measures the impact of six independent variables on the returns from the stock market. Variables that showed the most significant impact on the stock market returns in the first model were used in this model. Thus, the second model is an abridged version of the first model.

The third model employs war characteristics by duration to study further the impact of the length of war on DJIA returns. The Short War variable represents the first six months of U.S. involvement in the war. Previous research shows that the stock

markets react positively to quick and cost-effective wars (Brune et al., 2012). The impact of short wars is expected to be magnified (Guidolin and La Ferrara, 2005). Chourdy (2011) showed that prolonging of the war decreased the stock prices. Thus, the reaction of stock markets to wars that last between seven months and two years will be tested. Because Brune et al. (2012) argue that investors' expectations about the war ending will have a positive impact on the stock market, the effect of long wars was tested to see whether wars that last longer than two years will have a similar effect. These variables have multiple dimensions of importance as the effect of war on financial market performance is identified for different war phases.

According to Table 4, ten percent of the time observed was attributed to wars that lasted less than six months. From this we can conclude that about 17% of the wars fought are considered short. On the other hand, 12% of the period observed the United States was fighting a war that lasted between seven months and two years. Twenty percent of the U.S. wars since 1960 were longer than six months and shorter than two years. Since 1960, about 37% of the time, the U.S. was fighting a war that lasted more than two years. Thus, in the modern period more than half of the wartime, which is a period during which war was fought, the United States was involved in a protracted conflict.

The fourth model was created to analyze the effect of unilateral acts by the President and congressionally authorized wars on the stock market. To measure the effect of unilateral acts on the stock market, quarters in which presidents engaged in military operations at least one day unilaterally were observed. These wars are shorter and more cost-effective because of lower Congress support and limitations imposed by War Powers Resolution. Table 5 shows that presidents used force unilaterally for about eight percent of their wars. The conflict in Libya in 2011 was excluded from this analysis

because the period of U.S. involvement in Libya overlapped with the period during which the wars in Afghanistan and Iraq were fought.

<b>Table 5: Unilateral Acts by the President (1960-2015)</b>		
<b>War</b>	<b>War Start Date</b>	<b>War End Date</b>
Mayaguez Affair	May 12, 1975	May 15, 1975
Operation Eagle Claw/ Iran	April 24, 1980	April 25, 1980
Conflict in Grenada	October 25, 1983	December 15, 1983
Conflict in Libya	March 24, 1986	April 18, 1986
Persian Gulf Escorts/Operation Earnest Will	May 17, 1987	September 26, 1988
Panama/ Operation Just Cause	December 20, 1989	January 31, 1990
Missile Attacks on Baghdad	June 26, 1993	June 26, 1993
Combat Operations in Somalia/ Operation Gothic Serpent	August 8 1993	March 24, 1994
Haiti/Operation Uphold Democracy	September 19, 1994	March 31, 1995
Bosnia and Herzegovina/Operation Deliberate Force	August 30, 1995	September 20, 1995
Iraq missile attacks/ Operation Desert Fox	December 16, 1998	December 19, 1998
Sudan and Afghanistan missile attacks/Operation Infinite Reach	August 20, 1998	August 20, 1998
Conflicts in Yugoslavia/ Serbia	March 24, 1999	June 11, 1999
<b>Source: Fisher, Louis (2004). <i>Presidential War Powers</i>. Lawrence, Kansas: University of Kansas Press.</b>		

Most of the major wars since 1960 had congressional authorizations. Because of the congressional authorization, these wars were usually longer than unilateral acts by the president. Congressionally authorized wars had less legal limitations on the use of resources. Thus, they are considered to bring greater costs to the United States. To investigate the effect that Congress authorizations of war had on the stock market five wars listed in Table 6 were observed. Even though there are less congressionally authorized wars than unilateral acts by the president, the United States was fighting wars authorized by Congress about 51% of its wartime.

<b>Table 6: Congressionally Authorized Wars (1960-2015)</b>		
<b>War</b>	<b>War Start Date</b>	<b>War End Date</b>
Vietnam War/ Gulf of Tonkin	August 7, 1964	April 30, 1975
Conflict in Lebanon/ Beirut*	September 29, 1982	February 26, 1984
Persian Gulf War I/ Operation Desert Shield/Operation Desert Storm	August 2, 1990	February 28, 1991
Afghanistan/Operation Enduring Freedom	October 7, 2001	Present
Persian Gulf War II/Iraq/Operation Enduring Freedom	March 20, 2003	May 1, 2003
<b>Source: Fisher, Louis (2004). <i>Presidential War Powers</i>. Lawrence, Kansas: University of Kansas Press.</b>		

### Identification Strategy

To find the effect of war on the Dow Jones Industrial Average Index time series models are used. In these models, the estimated coefficients measure the relative change in DJIA ( $Y_t$ ) for a given relative change in the explanatory variables. The model I controls for the duration of war and beginning of war variables which are derived from the United States war dummy variable. The second model includes the most statistically significant variables from the first model. The third model looks deeper into the war duration variable to evaluate whether the duration of war has an impact on stock market returns. Model I: War length and beginning of war with other factors

$$\Delta \text{DowJonesIndustrialAverage}_t = \beta_0 + \beta_1 \text{DurationofWar}_t + \beta_2 \text{BeginningofWar}_t + \gamma X_i + \varepsilon_t$$

### Model II: War and Economic Indicators

$$\Delta \text{DowJonesIndustrialAverage}_t = \beta_0 + \beta_1 \text{DurationofWar}_t + \beta_2 \text{BeginningofWar}_t + \beta_3 \Delta \text{ConsumerConfidenceIndex}_t + \beta_4 \text{UnemploymentRate}_t + \beta_5 \text{InflationRate}_t + \beta_6 \Delta \text{RealGDP}_t + \varepsilon_t$$

### Model III: War types by length

$$\Delta \text{DowJonesIndustrialAverage}_t = \beta_0 + \beta_1 \text{ExchangeRate}_t + \beta_2 \Delta \text{ConsumerConfidenceIndex}_t + \beta_3 \Delta \text{RealGDP}_t + \beta_4 \text{InflationRate}_t + \beta_5 \text{ShortWar}_t + \beta_6 \text{MediumWar}_t + \beta_7 \text{LongWar}_t + \varepsilon_t$$

#### Model IV: War types according to war powers in United States

$$\Delta \text{DowJonesIndustrialAverage}_t = \beta_0 + \beta_1 \text{ExchangeRate}_t + \beta_2 \Delta \text{ConsumerConfidenceIndex}_t + \beta_3 \Delta \text{RealGDP}_t + \beta_4 \text{UnilateralActsbyPresident}_t + \beta_5 \text{CongressionallyApprovedWars}_t + \varepsilon_t$$

where  $\gamma$  Xi are eight different explanatory variables and  $\varepsilon_t$  is error over time.

This breakdown is modeled according to Brune et al. (2012) and Koubi (2005). It is a useful way to view the financial market reaction to war completely while keeping in mind other economic and non-economic factors that have an effect.

Models were tested for heteroscedasticity and multicollinearity and, given the variables used, none was found. A Durbin-Watson test was used to estimate serial correlation. No presence of autocorrelation was detected at the 10% significance level. However, when testing for autoregressive conditional heteroscedasticity (ARCH), it was found in all four models. First, third and fourth model have ARCH disturbance at the 10% level for the third order lag. The second model has both ARCH disturbance at first and third order lags, both significant at 5 % level. The regression estimates thus have error terms that are specific in size and variance. ARCH disturbance is a common feature of the financial time series because they usually exhibit time-varying volatility clustering. This volatility clustering means that present error term is related to the size of the error term in the previous time period. Financial and monetary periods exhibit ARCH problem because they usually have unsteady error terms caused by periods of high volatility that are followed by times of relative calm.

#### **Empirical Results**

Table 7 shows the regression results for all four models. While most of the economic and money measurement variables are not significant in explaining the percent

change in stock market returns, four variables showed a major impact.

During the first quarter of war, the war had a positive effect on the returns from DJIA. The stock market performance increased by 3.46 percentage points for the first quarter of the war. This regression result overlaps with Brune et al. (2012) findings that the start of war causes a positive reaction in stock markets. The reason for this positive reaction can be that the market is predicting expansion and improvement of the economy. Because wars stimulate the increases in GDP (Koubi, 2005), the investor perceives this as a signal that the economy is expanding. Companies in the technology sector are expected to have an increase in profits after the wars starts. Thus, investors increase the price estimation of these stocks. Another factor that might have influenced this positive effect that war beginning had on the stock market, is a decrease in uncertainty. War is no longer seen as a threat by investors. Once the information and news on the start of war are available, the investors increase their investment activity. Table 7 shows that the beginning of the war has a statistically significant effect on the returns from DJIA index.

Another factor that highly influences the return from the DJIA index is consumer confidence about the state of the economy. For every one percentage point increase in the degree of optimism in the Consumer Confidence Index, the return from the Dow Jones Industrial Average index increases by roughly 5.6 percentage points. This result estimation is significant at 1 percent level. Greater optimism about the economy increases consumers spending and savings. Apart from this, the companies expand their investment activity in research and development, or new production processes. Because increased investment leads to higher earnings, the value of stock increases. Investors are thus encouraged to raise their investment activity, which is reflected in the stock market performance. It is important to note that when testing for correlation, Consumer



Confidence Index and the Beginning of war variable were not highly correlated variables.

There is no discernable relationship between stock market returns and economic indicators and money measurements. For example, between 1960 and 2015, the correlation of DJIA returns (as percent change) to the budget deficit is 0.0002%. This indicates a feeble relationship which is highly insignificant as well. Because the budget deficit and budget debt do not affect the financial stock markets unless there is a change in news and information, the two variables were dropped from the second model.

Table 7 below shows that the only two variables significant in the second model were the beginning of war variable and Consumer Confidence Index, which confirms our results from the first model. The estimations of the magnitude of impact were almost the same as the estimations from the first model.

In an attempt to further study the impact of war duration, the third model looked at the war by the amount of time it was fought. When controlling for the length of the war, short wars had a statistically significant impact on the quarterly change in DJIA index. For every war shorter than six months the return from DJIA index increases by 3.48 percentage points. Investors' expectations about cost-effective and a quick war, in which victory is more likely, could explain the positive impact on DJIA index returns. The idea of quick and profitable wars is supported by this finding. Unlike short wars, wars that last between seven months and two years have a negative effect on returns from the stock market. While the estimation is not statistically significant, it still gives an insight into the direction of the medium wars effect on the stock market. Long wars seem to have a small positive impact on the returns from DJIA. Apart from having the relatively weak relationship with the stock market performance, the estimations of long wars impact is highly insignificant. An explanation behind why no statistically significant

effect was found between these war duration variables might be the unit of reporting used in this study. Because quarterly data gives a more general estimate for wars impact, it was hard to identify “turning points” and “blips” during these wars (Chourdy, 2011). Thus, quarterly data may not be able to capture the real effect of a prolonged conflict.

The effects of unilateral acts by presidents are similar to the effects of short wars and start of wars. For every quarter in which presidents engaged in military operations at least one day unilaterally, the Dow Jones Industrial Average Index returns increased about 3.5 percentage points. Because of lower Congress support and greater limitations imposed by War Powers Resolution, the market reacts positively to unilateral uses of force as these wars are supposed to be shorter and more cost-effective. The investors do not necessarily predict that these wars will be short and cost-effective. Analysis from previous sections indicates that increased public support for short wars, the initial economic expansion, economic policy implemented for the war purposes and type of war financing might be responsible for this positive effect on stock market performance. However, because these variables were not incorporated into the regression analysis, it is undesirable to make any certain assumptions that these are factors are the underlying explanations for the positive relationship between unilateral acts and financial markets.

**Table 7: Dow Jones Industrial Average Index (Real Change) Regression Results**

Variable	Estimated Coefficients (Standard Error)			
	Model I	Model II	Model III	Model IV
Beginning of War	3.4641 (1.9396)*	3.5567 (1.5088)**		
War Duration	-0.0219 (0.0394)	-0.062 (0.0304)		
Consumer Confidence Index	5.5791 (0.9564)***	5.6541 (0.9026)***	5.9843 (0.9091)***	5.4399 (0.8961)***
Unemployment Rate	0.1646 (0.4768)			
Real Debt (% $\Delta$ )	-0.1740 (0.6726)			
Real GDP (% $\Delta$ )	0.6037 (0.5709)	0.6169 (0.5627)	-0.7367 (0.5575)	0.5340 (0.5505)
Real Deficit (% $\Delta$ )	0.0002 (0.0024)			
Inflation Rate	0.4816 (1.0667)	0.5301 (0.7453)	0.8267 (0.7797)	0.4473 (0.7470)
Exchange Rate (GBP/USD)	-1.5955 (1.9732)	-1.8191 (1.8767)	-2.4898 (1.9866)	-1.3044 (1.8456)
Interest Rate	-0.1096 (0.1928)			
Short War			3.4841 (1.5088)**	
Medium War			-1.9371 (1.4805)	
Long War			0.2146 (1.2118)	
Unilateral Acts by the President				3.5488 (1.5569)**
Congressionally Authorized Wars				-0.5399 (1.0607)
Constant	3.9218 (4.0493)	4.0569 (2.8375)	4.7833 (2.9637)	3.3312 (2.8134)
R <sup>2</sup>	0.2310	0.2291	0.2503	0.2429

*Note: See text for variable definitions and sources. The standard error is reported in parentheses beneath the estimated coefficient. \*\*\* indicates the significance at the 1 percent level, \*\* indicates significance at the 5 percent level and \* indicates significance at 10 percent level.*

## **Discussion and Conclusion**

This chapter investigates the effect of war on the movement of quarterly percent changes in the return from Dow Jones Industrial Average index. Specifically, the impact of the length of the war and the outburst of the war was observed for its effect on return from DJIA index. While the results on the effect of the duration of war failed to explain the change in the financial market returns at a significant level, differences between the war types by length and use of war powers can be used to predict some movement in the DJIA index. Thus, the type of war led by the United States matters to the stock market and investors. A significant positive relationship was found between unilateral uses of force by President and stock market performance on a quarterly basis. Short duration, allocation of resources, public support for the quick and cost-effective war, and underlying macroeconomic effects of such wars (such as economic expansion, economic policy implementation and war financing) might explain why stock markets react positively to unilateral uses of force. Finding that short wars tend to increase the quarterly returns from the Dow Jones Industrial Average supports the prediction that war duration affects stock prices (Koubi, 2005). The stock market performance also increased because the start of war reduced the uncertainty caused by the “war risk.” To further investigate why unilateral acts had a positive impact on the stock market, future research should incorporate different indicators of economic expansion, war financing variables and variables that describe the type of economic policy that the government implements.

The “war puzzle” theory by Brune et al. (2012) was not confirmed as regression results on medium and long wars was statistically insignificant. Since quarterly data may not be able to capture the real effect of prolonged conflicts, future research should look at different units’ of war duration measurement (such as daily, weekly or monthly) to

analyzes further the impact of wars' length on the movement in stock prices.

Even though it was not a variable whose effects were initially observed, the consumers' confidence on the state of the economy had a large impact on the returns in financial markets. All four models showed that on a quarterly basis, for every percentage increase in the degree of optimism on the state of the economy is expected to increase the Dow Jones Industrial Average index return.

The autoregressive conditional heteroscedasticity made the regression results insignificant for the majority of the economic indicators and money measurements. This ARCH problem suggests that nonlinear time-series models should be used to analyze the investors' perceptions of risk during the war and expected returns. This thesis provides a useful way for studying how investors and financial markets react during wartimes. Findings from this study have important implications for investors studying risk management today and in the future.

## **Chapter 5: Looking to the Future**

The adverse effects of wars on financial markets have caused many researchers to look deeper into the reactions of stock market to war shocks. Segmenting the war into pre-war, post-war and during-the war periods is central to the identification of specific factors that influence the United States financial market to react. This thesis seeks to show that the U.S. involvement in war has a significant effect on the U.S. stock market performance, specifically returns from Dow Jones Industrial Average.

In the pre-war period, information from history and news seems to control the direction and magnitude of the war's effect on stock prices. The anticipation of a future war depresses stock prices. An increase in probability of war will decrease stock prices, while the outburst of war will have a positive impact on the returns (Brune et al., p. 3). The only instance where the increase in war risk has a positive effect on stock markets is during major wars such as World War I and World War II (Ferguson, 2008, p. 468). Effects of wars of different scales and nature should not be generalized. Instead, specific war characteristics such as regulatory regimes or developments in military and technology should be accounted for when extracting lessons from history (Ferguson, 2008, p. 436). Apart from this, war with prologue has a positive impact on stock prices while surprise wars and terrorist attacks magnify a decrease in financial returns (Brune et al. p. 3).

During a war, "turning points," or war events important to investors, had a much larger impact on stock markets by causing escalation of prices when the United States was winning the conflict. On the other side, when the United States was losing an important battle, stock market prices decreased (Chourdy, 2011). Blips, or one-day war

shocks, had less of a severe impact on the stock market. Apart from these adverse effects, intensification of conflict may lead to a rally in the U.S. equity market (Schneider & Troeger, 2006, p. 642). The destination and social structure of countries where the U.S. is fighting war matters (Guidolin & La Ferrara, 2005). When it comes to international conflicts, the U.S. stock market has more positive reactions than negative ones.

Polarization and the duration of war impact the magnitude and the direction of impact (positive or negative) on domestic financial market performance (Guidolin & La Ferrara, 2005).

After the war has ended, the financial stock market experiences major fluctuations in stock market returns. The reasons for this may be economic recessions, postwar policies and the costs of war influences financial markets in the post-war period (Chandler, 1967). War had adverse effects on specific sectors in the market (consumer discretionary and business equipment) as well as oil prices. Political securities could be used to predict the uncertainty of equity prices after the war ends (Leigh et al., 2003, p. 2).

It can be argued that, given the economic effects of the war, the United States ought to have a clearer system in place, demanded by people, about war. The argument that, on balance, war has positive effect on the stock market is not a reason to conclude that the status quo regarding war is acceptable. The war should not be promoted for economic or financial benefit, and costs to humanity should be taken into consideration. Politically, it can be argued that elected officials are undermining accountability to government, which is essential to a healthy democratic republic. Instead, many unilateral uses of force have impacted the United States economy, law making and budget allocation.

This research provides empirical evidence that war has a statistically significant impact on the returns from stock markets in the period between October 1960 and September 2015. Specifically, the outburst of a war and wars that last less than six months increase the percent change in return from Dow Jones Industrial Average index. The basis of the methodology is that the war's impact can be determined by observing periods of change in volatility during a war. The thesis shows that the nature of war, conflict developments, ways of war financing, duration of war and timing of war influence the direction and magnitude of wars impact on the financial market in the United States.

These findings can be applied to different areas of finance such as risk management, and corporate finance. In corporate finance, these estimations could be used to predict earnings of companies in a "war" or "peace" portfolio. Investors should require financial institutions and stock markets to identify, assess, monitor and control or mitigate risks that result from wars or terrorist attacks. In the pre-war and initial phase of war, "war risk" factor and Consumer Confidence Index (CCI) may reduce the uncertainty about future movement in prices. Identification of potential threats can help investors reduce uncertainty and make more accurate expectations about the volatility in financial markets.

Future research should look into datasets that report variables in daily, weekly or monthly terms. While quarterly data is easier to use when identifying changes in trends and better for long-term strategic forecasting, they could overlook important and significant changes in returns from financial markets. Future research using daily data would account for lags and leads relationship and possibly avoid the autoregressive conditional heteroscedasticity (ARCH) problem. By using ARCH or GARCH models,



deficiencies of least squares model can be corrected and predictions can be computed for each error term. These models could provide a volatility measure that can be used in financial decisions concerning war risk analysis. Apart from this, future research could use different market performance indicators within the United States, such as Standard & Poor's 500 (S&P 500), and indexes outside the United States, such as Financial Times Stock Exchange 100 (FTSE 100) Index or Shanghai (SSE) Composite Index. Future studies could also look further into war characteristics to explain adverse effects of different wars on the U.S. financial market. Some of the possible characteristics to be observed in the future could be the number of casualties, the level of innovation in technology and political structure of countries involved in the conflict.

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